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HORIZONTAL INTEGRATION OF THE ENERGY INDUSTRY

HEARINGS

BEFORE THE

SUBCOMMITTEE ON ENERGY

OF THE

JOINT ECONOMIC COMMITTEE

CONGRESS OF THE UNITED STATES

NINETY-FOURTH CONGRESS

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HORIZONTAL INTEGRATION OF THE ENERGY INDUSTRY

WEDNESDAY, NOVEMBER 19, 1975

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON ENERGY
OF THE JOINT ECONOMIC COMMITTEE,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:35 a.m., in room 4237, Dirksen Senate Office Building, Hon. Edward M. Kennedy (chairman of the subcommittee) presiding.

Present: Senator Kennedy.

Also present: William A. Cox, professional staff member; John Stewart, subcommittee staff member; Michael J. Runde, administrative assistant; and George D. Krumbhaar, Jr., minority counsel.

OPENING STATEMENT OF CHAIRMAN KENNEDY

Chairman KENNEDY. The subcommittee will come to order.

The Senate and House are now putting the final touches on the Energy Policy and Conservation Act of 1975 that will soon be on its way to President Ford. If the President decides to sign this omnibus bill, and I hope he does, the most contentious issue that has divided the Ford administration from a majority of the 94th Congress—the question of domestic oil prices—will be resolved. Other important features of the pending legislation, such as a strategic oil reserve to protect us from the threat of another oil embargo, mandatory automobile energy efficiency standards, labeling of major appliances for energy efficiency, and standby emergency energy measures, will also become law. The legislation is a responsible and significant step forward in writing an effective and fair national energy policy.

But more steps reman to be taken. Today, the Subcommittee on Energy of the Joint Economic Committee opens 2 days of hearings on a topic that, in my judgment, will increasingly command the attention and concern of Congress in the months ahead, namely, the control of domestic energy resources. This issue is worthy of careful and continuing congressional scrutiny because who controls our energy resources will effectively control the lifeblood of the American economy. How this control is exercised in the coming years will obviously be a major factor in determining whether our economy serves the needs and interests of the American people.

Events of recent years raise grave questions in my mind whether this goal of serving the public interest is being realized under present arrangements of resource control in the energy industry. The approach of the "energy crisis" has been accompanied by a rapid expansion by

the major oil companies into competing energy fuels. These oil companies, which traditionally have wielded great power in oil markets and great influence over public policy toward their industry, have now become integrated, all-around energy conglomerates. Mr. John W. Wilson, of J. W. Wilson & Associates, will develop these trends in his testimony before the subcommittee this morning.

Let me illustrate briefly what has taken place. Oil companies now own over half of the privately held U.S. reserves of uranium and play a major role in both the mining and processing of this increasingly important fuel. They are the only major producer of geothermal energy and they own a sizable share of the potential geothermal sites. They hold virtually all of the privately held oil shale reserves. Since 1964, major oil companies have acquired an estimated 40 percent share of the Nation's private coal reserves. We see this pattern illustrated by the Continental Oil Co., whose representative, Mr. Hardesty, will testify here this morning. Conoco is the 14th largest oil and gas producer, the 2d largest coal producer, and the 9th largest uranium producer.

This pattern of integrated control over competing energy sources raises a number of economic questions that have to be examined carefully. What is the level of competition not only among the major energy conglomerates but among the energy resources controlled by these companies? Are the energy companies developing their varied energy holdings in a manner that adequately protects the interests of energy consumers? Why have levels of domestic energy production continued to decline in this period of high energy prices? Mayor Joseph Alioto will testify this morning on the question of the price of geothermal steam resources used in generating electric power for residents of San Francisco.

There is a further question: If the present levels of integrated ownership continue to rise, what will be the competitive situation 10 years from now? In the period when our drive to reduce dependence on high-price imported oil should be producing results, will a competitive energy market exist in this country? If it doesn't, what will be the economic consequences in terms of consumer costs, life style, economic structure, and so on? These questions reach very deeply into the economic and social fabric of this country.

In addition to these economic questions, there are broader considerations of public policy to be weighed. It can be argued that the growing power of integrated energy companies—arising in large part from their control over competing energy sources—has made it possible for them to exert strong influence over Government in pursuit of higher fuel prices. We must also recognize that domestic oil is under the production control of multinational energy companies that have a vested interest in maintaining the world cartel price set by OPEC. These same companies also coordinate and execute OPEC's price-market sharing agreements.

What will be the political leverage of major energy companies if the integrated ownership of energy resources continues? As the energy industry speaks increasingly with a single voice, are the policy choices before Congress and the executive agencies likely to be restricted? Will the Government be able to protect the consumer's pocketbook from price gouging, or the citizen's health from pollu-

tion, or the Nation's coastlines and mining lands from exploitation? Or will we be confronted with a situation where giant energy companies, in response to such Government action, simply threaten an energy shortage and the Government backs down?

Today's witnesses will deal with the extent and significance of multifuel conglomerates. They will approach this issue from different points of view, and I am looking forward to a lively exchange of fact and opinion. One witness, Mr. Scherer of the Federal Trade Commission, also will discuss the potential role of Federal leasing policy as a tool to diversify ownership of the large energy resources still remaining in the public domain.

Our opening witness is the distinguished mayor of San Francisco, the Honorable Joseph Alioto.

STATEMENT OF HON. JOSEPH ALIOTO, MAYOR, CITY OF SAN FRANCISCO

Mayor ALIOTO. I am glad to be here, Senator Kennedy.

Chairman KENNEDY. You have appeared on many different occasions before the Judiciary Committee, particularly in the area of antitrust policy, where you are an acknowledged expert. We express very much our pleasure in having you appear here today. We look forward to your testimony.

Mayor ALIOTO. Thank you very much, Senator Kennedy. What you are doing here is extremely important to the U.S. Conference of Mayors. I am here representing the U.S. Conference of Mayors, as its immediate past president, and I have been associated with and representing the Conference of Mayors on matters relating to energy. They tell me I was selected because in addition to my role as mayor, my law office played a very prominent part in connection with actions against oil companies in the inner mountain area and the Pacific coast. As a matter of fact, I think the first substantial damages ever paid under the antitrust laws by the oil companies to some of its victims were the product of certain actions brought by my law firm. In addition to that, that law firm of mine handled a very important uranium case, *Continental Oil Company* v. *Union Carbide*, and that was before the Supreme Court of the United States. It was a case that involved the monopolization of the uranium reserves of the Colorado plateau, a monopolization that paradoxically was furthered by the Manhattan Project itself. And it is out of that background that I am here representing the U.S. Conference of Mayors.

I don't have to tell you that the energy policy is important to the cities of this country, not only because they are substantial users of high-priced gasoline in their police cars and fire trucks and municipal vehicles generally, but also because the impact on the economy of high-priced fuel and the things that have generated high-priced fuel affects our ability to collect sales taxes, affects our ability to collect taxes generally, and impoverishes the city. It is for this reason that we want to commend this subcommittee, to commend you as its chairman for calling this hearing.

As you know, it was some 7 years ago that I testified, again on behalf of U.S. Conference of Mayors, on behalf of certain private groups before a group headed by Senator Hart, of which you were a member,

and in which pointed out that one of the big vacuums in terms of enforcement of the antitrust laws was the failure of the Department of Justice to deal with the interlocking controls of competitive commodities or of competitive professionals. There was a great deal of talk at that time as to whether or not newspapers, for example, ought to be owning television stations; a great deal of talk as to whether or not can companies ought to be owning bottle companies; there was a great deal of talk about whether or not there ought to be interlocking controls between steel and aluminum. These are the things that we talked about. We believe that there has been an absolute failure as to enforcement so far as the Department of Justice is concerned in this most significant field.

You are dealing with what we regard as the most important antitrust situation since the original oil cases. Now, the first question is why legislation? In other words, why should divestiture be accomplished by legislation, rather than through the judicial process?

Well, we are no strangers, of course, to the notion of divestiture, whether it be by the courts or legislature. Holding companies have had divestitures of airport transport companies and other forms of transportation, and the legislature has insisted upon those things. The Federal Trade Commission has insisted upon some divestitures as between television companies and radio companies and as between television companies and newspapers. So there is nothing new about legislatively directed divestiture. There is nothing new about it at all.

There is certainly nothing new about divestiture as the result of court action, including of the oil companies themselves. There is the famous divestiture, of course, of the Standard Oil Co. at the beginning of the century and more recently divestiture of exhibition as far as the motion picture producing companies are concerned. So there is no problem about novelty that we are talking about here. Sometimes you get that impression when you hear opponents of this legislation.

But, again, the question is why legislation instead of court-directed divestitures? There are two reasons. The Department of Justice compared to the private bar has not been as effective in terms of acting as a deterrent to antitrust violations as the private bar has. The Department of Justice has hesitated, as well as the Federal Trade Commission, to go on divestiture cases because the history has been they get so bogged down in the courts that there is a tendency to compromise when you get down to critical issues. The Department of Justice bore the so-called *Mother Hubbard* case against the oil industry in 1940 at a time when Thurman Arnold was running the Antitrust Division of the Department of Justice, and they got bogged down. When they tried to segment it and direct it to the Pacific coast, they wound up with a consent decree where divestiture of service stations was refused at that time, but wherein the Department of Justice recognized such price fixing devices as confinement contracts in the oil industry as legal. So, only a private action brought by my action finally got to the Supreme Court.

In the *Simpson* case, in *Simpson* v. *Union Oil*, in which even the confinement contracts, which were just resale price fixing devices and which had been agreed to by the Department of Justice in the consent decree in the Pacific coast oil cases—it actually agreed to it—and the Supreme Court held that was a violation of the price fixing provision.

And so the Department of Justice, just as a matter of history, has not been effective because of bureaucratic controls, because there is a tendency for these cases to get bogged down in the courts. So it is just not effective enough to bring about the kind of divestiture we think is desperately needed in the oil companies.

There is another reason why we should have legislative divestiture instead of judicial divestiture so far as these competing materials are concerned, and that is all we are talking about now. The courts have held—and I don't know where they got this. This is court law and not Congress law—but the courts have held that a private party may not bring a suit for divestiture. They have thus taken away the incentive for private groups who know, maybe, something about the intimate details, the intimate impacts of divestiture upon the industry, taken away their ability to go to court and get anything done.

This was a case handled by my law office involving Hawaiian Telephone Co., which was acquired by General Telephone Co. We brought action. It was a very strange plaintiff, Senator Kennedy, and this is why the courts were wrong. The plaintiff was ITT that brought the action to have divestiture of the Hawaiian Telephone Co. from the General Telephone Co. because of the impact it had on the manufacturing arm of ITT because Sylvania, the General subsidiary, would probably take over those contracts. And the courts have held, the Court of Appeals of the Ninth Circuit held that the divestiture, which would be secured in the district court in Hawaii, was not available to a private plaintiff. We couldn't get into the Supreme Court.

So, you see, it is very difficult for antitrust plaintiffs to get into the Supreme Court today. That is one other reason why this significant divestiture on interlocking control of competing materials ought to be handled by legislation.

Now, I had planned to give recitation of the evolutionary development by which the oil companies secured control of what are basically competing materials, but that has already been given in your introductory statement, and I understand it is going to be gone into in detail. So, we will simply accept the ultimate fact, until it is presented in detail, accept the ultimate fact that the purposes of my presentation is to state that the oil companies have achieved a dominating control over what would normally be competitive source material.

We will take that as an ultimate fact, and I think your opening statement set forth the significant facts. Now, starting on that assumption, if free enterprise is really to be the free enterprise system, it contemplates not only competition between companies, but it contemplates competition between commodities or between materials. And the theory is that commodities ought to be permitted to compete on the merits. In other words, they ought not to be tied one to another or synchronized, or orchestrated, one to another, if you are going to have a truly competitive economy. I think that is very, very significant.

Now, on the principle that no man can serve two masters, any interlocking control of competitive materials, such as oil, coal, geothermal, nuclear, nuclear power, any interlocking control is going to result inevitably in orchestrating the development of each in accordance with the one that produces the greatest profit. I think that is just simply human psychology that the antitrust laws take cognizance of and that we ought to take cognizance of in seeing that this legislation is passed

and passed in a hurry because it is very, very important. I think you have that simple thing as a matter of psychology, but we don't have to rely on psychology. We have the history to look at.

The geothermal resources of California are the greatest producing geothermal resources in the world today. There are only three deposits, as a matter of fact, in the world today: one in northern Italy, one in northern California, one in Japan. Those are pure steam. The others are hot water devices that get changed into steam. That has been controlled basically by the oil companies. Five years ago I made a presentation before this same subcommittee——

Chairman KENNEDY. Before we get into that, Mayor, why, if you feel—and I understand a number of members of Congress feel this way—that the oil industry—at least this case is made—the oil industry is about as competitive as any of the major kinds of industries of our society and they are moving into these alternative sources of energy, so if you feel that way, why not, if they are basically competitive themselves, and if they are going to be able to return the greatest profit in terms of the development of the alternative sources, then why not let the free flow of economic competition bring you better efficiency or lower prices in terms of other sources of energy?

Mayor ALIOTO. Well, let's talk about this, not in terms of an opinion, but just in terms of the history. The oil companies, to put it bluntly, cannot be trusted to exploit competing materials on the competitive levels.

Chairman KENNEDY. Why is it? Is it just the industry generally, or what is it?

Mayor ALIOTO. Well, let me give two examples of exactly what we are talking about. Two of the items you are talking about are geothermal steam and nuclear power. In 1956 a lot of perceptive Common Market executives began to perceive that dependence of Europe on Middle East was a serious political mistake. They had a political acuteness, a little more intense, perhaps, than ours. So they came out very, very strongly for the development of nuclear power in Europe to offset their dependence upon the Arab cartel, which at that time was a cartel of buyers, the so-called five American companies, the one Anglo-Dutch company, and the one British company. And the principal lobbying effort against the Europeans becoming self-sufficient as far as nuclear power as a competitive thrust to the Arab oil, the principal lobbying activities were by the partners in the Arab cartel, that is, by the same oil companies we are talking about today, namely, the dominant oil companies. So, there were seven of them.

We generally talk about the rest of the companies that were offshoots of the old Standard Oil divestiture, like Amoco, Conoco, the Standard Oil Co. of Ohio, and others, as also being part of that intensive lobbying effort that defeated the attempt of some perceptive Europeans to become a little more dependent upon nuclear, rather than oil, power. Now, that is a matter of history. That history ought to be exploited as part of this record because it will give you the best case in point of why you can't trust the oil companies to develop the nuclear power in real competition to oil.

Now, there is another example. That geothermal steam power is another example. We got into this geothermal steam in a curious way. Eleven cities, all of whom belong to the National League of Cities and

the U.S. Conference of Mayors, these 11 cities in California went to the Union Oil Co. and wanted to buy geothermal steam. The company told them to get lost. They told them they didn't have any steam to sell to them. Now, that seemed curious to us because they had the bonding capacity at that time. The municipal bond market was strong at that time to build the generators that were necessary to generate electricity from geothermal steam. Now, we raised the question with the oil companies. And we began to look into it very, very seriously. We made a factual presentation to you and Senator Hart approximately 4 years ago about this. We were looking into it further—and, of course, things have become public since that time—but we told you, Senator, very, very early on about that, that the price of geothermal steam was not being determined on the basis of the cost of production of geothermal steam but it was being tied to an oil price, to a hydro price, and to a natural gas price by an intricate formula, which has been stated in several places somewhat obscurely. But the ultimate fact remains that geothermal steam was not being sold on the competitive merits; it was instead being priced on the basis of oil with escalation clauses which took notice of the rising price of oil. Now, those are just two examples, very clear examples.

I want to give you a third example because we talked about that too, and it demonstrates what the oil companies can ultimately do without competition. Electric transit was at one time a competitor to gas-eating auomobiles. And you have a very extensive record here that has been compiled by the Antitrust Committee of the Senate as to the acquisition of public electric transit systems by General Motors and the oil companies and the tire companies. And after acquiring those transit systems, they closed them down. You have a very impressive record. They closed them down and dismantled them. So, basically, what I am saying, Senator, is that it is not a competitive flow from companies able to finance this thing that are going in to exploit these competitive sources on their merits; they are going in to handle them on a controlled basis. And nobody can argue with them in terms of their self-interest because, you know, their major profits come from oil. Their major oil concessions of the world, I'm talking here about the Arab cartel, the concessions they have in the Arab oil cartel, well that still is the lowest priced fuel that is available.

And there is a more significant reason yet, Senator. This is a reason why you are not likely to get competition—and I don't believe you have heard it at this hearing—and I would like to make this part of the record. This gets a little obscure, but I would like to state this for the record. The paradox now remains that the most significant economic force we have to fight the monopoly pricing of the Arab cartel with OPEC organization, the most significant economic force remains the original seven companies that organized the cartel on a buyer basis before it was organized on a producer or seller basis. They remain the most significant force for getting some moderation because of their worldwide ability to handle oil exploits and to look for other reserves. But there is an underlying economic factor that must never be ignored. There isn't anything—and I think the president of Exxon brought it out very clearly last week—there isn't anything we are doing now in connection with the exploration of new oil that is going to be competitive costwise with the Arab oil because production over there in 1966

was said to be 10 cents a barrel. Now it is said to be 20 cents or 30 cents a barrel but those cost figures are somewhat obscure, as you know. Now, the American and British and Dutch companies in their negotiations with that cartel are going to be subject to certain influences of that cartel. And one of the influences of that cartel may very well be negotiated demand that they slow up the development of competitive fuel. So the ultimate answer is that I don't think that economically you can trust the oil companies to exploit these other sources on the competitive merits.

And you know this is an old antitrust concept. There is nothing new about it. There have been cases about it in the past. There was some suggestion by the Supreme Court in the *Continental Can* case, for example, that a can company ought not to be buying a bottling manufacturing company at a time when some of the canning companies were looking to distribute by cans. The same basic philosophy exists in the antitrust laws which dictates there should be competition and which, therefore, dictates there should be unfettered competition between competing sources and not an interlocking control.

So, I think, Senator, that is the ultimate answer to your question. So that is our position at the U.S. Conference of Mayors. And our position is based on the experience we have had in these industries. And we would suggest to you that there ought not to be a lackadaisical approach to getting this very important divestiture accomplished.

If the divestiture of companies takes place now, despite the acceleration of acquisitions of competitive fuel by the oil companies in the past 15 years, but divestiture is not going to present any problems that we really haven't known about in the past, but it must take place soon. And I think that there is a real urgency.

And when people ask what other companies can be taking over these alternative sources, well, I could say the mining companies ought to be taking over natural gas as a natural adjunct to coal. The mining companies ought to be into that field and which would get them competitive, too, in some aspects, as far as geothermal is concerned. There are huge economic forces available that aren't tied to an OPEC cartel and who won't be influenced by demands of an OPEC cartel, as we believe the American companies would be.

So that is our basic presentation, Senator.

Chairman KENNEDY. Couldn't you make the case, though, that if they were able to develop the alternative sources of energy they might be in a stronger position in bargaining with OPEC?

Mayor ALIOTO. That sounds plausible on the surface.

But let me just say this. Alaskan oil, they are telling us, is coming in—and that is an alternative source—Alaskan oil is coming in, at least according to the president of Exxon, at a cost of $14 a barrel. The Arab oil cost, as I said, is between 20 and 30 cents. Those were the last reported figures anybody has, although they are not that reliable.

If you analyze the oil industry in the 1920's you have to remember that basically—what Rockefeller had was basically a buying cartel at the turn of the century that was able to operate on the producers. That is why I said a little earlier the paradox is that the most effective counterforce we have to the OPEC forces right now are the huge buying abilities, the consumer control of the American and British companies.

Now they have to fight for concessions from OPEC. They are in no position to compete with OPEC on terms of cost. They just are not. And there is also a threat, such as happened to the American industry, that you could use price cutting as a means of defeating competitive competition. And if you could do that, there could be a negotiated demand by the OPEC companies that, you know, "You are not going to get any concession from us unless you slow it up on what you are doing on your alternatives." So there is a hold there that the OPEC companies can actually exert on the exploitation of these competitive sources. And that is why I say that if there were differing companies handling it other than the oil companies, there would be a greater incentive to develop these competitive materials on the economic merits. I know the oil companies have huge resources that can be used competitively, but they are in no kind of contest, costwise, with the OPEC crowd. I think they have to be released from the disposition to grant concessions to the OPEC cartel with respect to competitive materials.

That is what I think is the ultimate answer to the issue you raise.

Chairman KENNEDY. Let me ask you whether you feel that the electric power consumers of San Francisco would be receiving their electricity at more reasonable rates if the law did not permit in northern California the major geothermal sites to be bought up by these integrated companies?

Mayor ALIOTO. I haven't any question about the fact that geothermal scheme would not be priced so as to synchronize it with oil if it were handled by a nonoil producer, Senator. I haven't any question about that.

Geothermal steam is the cheapest way of generating electricity. It is something like one-third the cost of oil, the last time I looked at it. According to figures submitted by P.G. & E., our public utility company, it is one-third in terms of cost.

We also feel there ought to be competition, as between themselves, in those geothermal fields.

And, incidentally, those geothermal fields we think are being developed on a measured basis rather than an open-competition basis. We think this is significant. When we started out we had estimates of the oil companies that there was only the substantial equivalent of one nuclear plant in the geothermal field, and that is approximately 12 million barrels of oil. They said only one nuclear plant.

The Italian geologists who have been working in northern Italy since 1904 said there were at least 10 nuclear plants. And the geysers alone—and this is one area 90 miles from San Francisco—generate enough for 10 nuclear plants. Some professorial estimates from the University of California have been as much as 25 nuclear plants in that one spot alone.

This is the cleanest and cheapest way of generating electricity and——

Chairman KENNEDY. What conclusions do you draw from the failure to develop it?

Mayor ALIOTO. The conclusion is there has been a noncompetitive development of geothermal steam because it is being tied to oil. That is my conclusion.

Chairman KENNEDY. Well, if they are getting a good deal more of a profit from being able to tie the price, why isn't that more profitable for them, and why hasn't that meant increased production?

Mayor ALIOTO. Because I think we have to generate competition among firms dealing in geothermal steam that will give us a greater exploitation, a greater desire to move the countryside around, such as in San Ramon and the rest of northern California and Nevada, to develop geothermal steam.

You know the former Secretary of the Interior, the former Governor of Alaska, has estimated—and he did this in a rather convincing study—you can generate as much as one-third of the electricity we need in this country from geothermal resources.

It is my suggestion that is not going to happen as long as geothermal steam is tied to the apron strings of oil.

Chairman KENNEDY. On the question about a revision of a geothermal contract, if the parties to a contract have grounds to suspend their obligations when major unforeseeable changes in economic conditions occur—the *Westinghouse* uranium case—then don't you think that P.G. & E. and the California public utilities authorities have grounds for insisting on revision of the pricing clause of the P.G. & E.-Union geothermal contract since the prices of fuels to which geothermal prices are related in that contract no longer are remotely related to their costs and, in fact, are based on the most exploitive use of cartel power anywhere in the commercial history on record?

Doesn't this "unforeseeable" change provide grounds for revision?

Mayor ALIOTO. I think that particular pricing thing constitutes a violation of the antitrust laws, and the Department of Justice ought to be able to handle it.

I must say, with respect to P.G. & E., it is a great company and has done a great job in many respects, but they have a competitive situation involved: They don't want those 11 cities to start generating their own electricity. They have a motive in combating that kind of public power. They make no bones about not criticizing them for it.

I'm simply suggesting to you that the other parties to the contract may not have the motive of opening up the geothermal fields to public power such as the 11 cities in California that want to buy the geothermal steam from Union and were told to get lost.

Chairman KENNEDY. I think you touched on it before in your earlier comments about what the general impact would be on the economy as a whole if you saw a successful divestiture plan.

Don't you think this could mean economic chaos in the development of alternative sources of energy?

Mayor ALIOTO. No: I think not.

I think, you know, if the theory of our antitrust laws is right, Senator—and I'm convinced it is, but it is a question of whether you believe it—but if the theory is right, we are going to get the lowest price, the best product in terms of quality, and the widest distribution when you have unfettered competition between and amongst competing companies and competing materials.

So, you know, people always tell you that.

But the first price fixing case involved the oil industry—well, not the first, but the definitive price fixing case involved the oil industry,

and they were told, unless they could take the moves they took, they were going to have ruinous competition and chaotic conditions.

That has always proved to be a false threat, Senator. I see no chaos from geothermal, uranium, and coal being developed on the competitive merits against oil. I see no chaos at all. I see, on the other hand, increased efficiency and a possible lowering of the oil prices as a result of that competition.

Chairman KENNEDY. Based upon your own experience when you had these major divestitures in the past by major industries, have the markets been able to absorb these divestitures reasonably?

Mayor ALIOTO. They have been able to absorb these divestitures without any problems at all. I think you have to look at the original divestiture.

The oil divestitures and the tobacco divestitures came very early in our antitrust laws. Remember, those antitrust laws were passed in 1890, and the cases were tried in 1906 and 1907. The divestitures took place over the next 10-year period. There was no economic dislocation from those divestitures. They promoted competition, but then they got all brought back together again.

The most recent case about widespread divestitures was when the motion picture companies were told by court order to divest themselves of all the theaters. They were told to get out of the exhibition business or at least separate the exhibition business from the business of producing motion pictures. And far from causing dislocations, that particular divestiture was able to open up the pattern of motion picture distribution so you didn't have Chinese walls around the downtowns of Boston and San Francisco and New York and neighborhoods that didn't get the benefit of first run pictures. You opened up that distribution and made it more competitive.

You also made it possible for a whole group of entrepreneurs to come in with a drive-in theater concept and offer genuine competition to the conventional theaters.

So the history of divestitures in the United States—that is, divestitures ordered by court—gives no basis at all for saying there is going to be chronic disruption. There is going to be, in fact, competition. And to some extent, competition is disruptive, but it is a beneficial disruption.

Chairman KENNEDY. Just finally, have you formed any impression about the President's program of the $100 billion investment with the major oil companies for the development of alternative sources of energy—that is, the message that he sent to the Congress?

Mayor ALIOTO. I think there ought to be a crash program by the United States to make itself independent of Mideastern oil. I think that is the most important crisis facing us since the war threat of the 1940's. I think that is the most serious threat that is facing us now. I think there ought to be a government program for substantial loans to permit the development of alternative sources, but I don't believe it ought to be done by the oil companies. I think that loan program ought to be done, but not to the oil companies.

We've got lots of big companies that are interested. We've got the electric companies and we've got the mining companies and we've got international companies. There is no reason to believe that there is

monopoly of business wisdom in the oil companies. There is just no reason to believe that at all.

Chairman KENNEDY. Well, I want to thank you very much, Mayor. We appreciate your appearance here and your appearing here on behalf of your organization and also because you have demonstrated a wide understanding and knowledge about this subject matter and material. It is something that we have to focus on very carefully as an issue in the Congress. We always benefit from your comments and experience. We want to thank you very much for your appearance.

Mayor ALIOTO. Thank you very much. I enjoyed the opportunity to make this presentation on behalf of the mayors.

[The prepared statement of Mayor Alioto, with an attachment, follows:]

PREPARED STATEMENT OF HON. JOSEPH ALIOTO

Mr. Chairman. Members of the subcommittee, I am Joseph Alioto, Mayor of San Francisco, and the immediate past President of the United States Conference of Mayors.

I am pleased to testify before you here today on behalf of the Conference of Mayors and I would also like to point out to you that I have some expertise on this subject having spent a number of years as an antitrust lawyer.

Mr. Chairman, the energy crisis facing this country today is of proportions which are difficult to describe. I shall not dwell on the crisis at this point, but simply remind you that as the winter of 1975 approaches, we are already aware of suggestions that here in the Northeast this country faces a natural gas shortage of 30 percent. The effect of this shortage both in relation to the quality of life in our homes and employment in our industrial society can be severe to say the least.

Mr. Chairman, when the Conference of Mayors met in Boston this past summer in formal session they considered a number of issues facing the nation's cities.

Perhaps one of the most important resolutions adopted at that conference by the mayors of this country dealt with competition in the energy industry.

While that resolution did not draw great public attention at the time of adoption, I should like to point out to this committee that it is a strong statement and that it is concerned with the vast concentration of power that has developed within the energy field.

The resolution is concerned with the growing evidence of violation and abuse of anti-monopoly and antitrust law by various elements of the energy industry.

In addition, the resolution states plainly that it would be in the best interest of the American consumer to be protected against the vast concentration of power that has developed with certain utilities and other interests in the energy field.

This resolution further states that the state of the nation's economy has been significantly disrupted by the spiraling cost of energy.

Furthermore, the resolution requests swift and positive action by the Congress to encourage competition in the energy field.

Mr. Chairman, this is an important statement by the mayors of this country and it was formally adopted on July 9, 1975, in Boston at the 43rd Annual Meeting by the U.S. Conference of Mayors. I submit a copy of the resolution for the record, Mr. Chairman.

Mr. Chairman, I would also like to point out that recent cases brought against national industries, mainly by private practitioners, has resulted in rather dramatic price drops even in the midst of inflation. For example, cases dealing with electric equipment, Gypsum wallboard, drugs, chemicals and corn products has resulted in price drops of up to 50 percent.

Mr. Chairman, that will conclude my brief formal remarks. I would be pleased to take your questions on this important issue.

Attachment.

RESOLUTION ON ENERGY COMPETITION, ADOPTED JULY 9, 1975, BY U.S. CONFERENCE OF MAYORS AT 43RD ANNUAL MEETING IN BOSTON

Whereas, there is growing evidence of violation and abuse of anti-monopoly and antitrust laws by the various elements of the energy industry; and

Whereas, it is in the best interest of the American consumer to be protected against the vast concentration of power that has developed with certain utilities and other interests in the energy field; and

Whereas, the state of the nation's economy has been significantly disrupted by the spiraling rise in the cost of energy,

Now, therefore, Be It Resolved that the U.S. Conference of Mayors is requesting swift and positive action by the Congress to encourage competition in the energy industry.

Chairman KENNEDY. Our next witness is Mr. John W. Wilson. Mr. Wilson is the former Chief of the Division of Economic Studies for the Federal Power Commission, and holds a Ph. D. in economics from Cornell.

Mr. Wilson, you may proceed.

STATEMENT OF JOHN W. WILSON, J. W. WILSON & ASSOCIATES, INC.

Mr. WILSON. Thank you, Mr. Chairman.

It is a pleasure to be here. My presentation this morning is divided into four parts. In part 1, I identify some of the recent trends that lead me to believe that integrated control by major oil companies over competing energy fuels is becoming a serious problem, and indeed, has been a serious problem in our economy for some time.

Part 2 is a background study concerning the competitive structure of the petroleum industry. I include this as part of my prepared presentation, but I will skip over it this morning. I will summarize it because it is essential to understand the oil and gas situation before assessing the significance of the petroleum industry's expansion into other fuel.

Part 3 of my prepared testimony is a brief case study of the petroleum industry's virtual dominance of the nuclear fuels processing industry. And, finally, in part 4, I present an historical perspective in assessing the extent to which reliance upon existing institutions, or new legislation is the optimal course for the future.

There is already a very substantial degree of horizontal interfuel integration that has taken place in the energy industries, and it appears that the trend is continuing. While those are the specific facts with which the subcommittee is immediately concerned, it should be stressed that the competitive implications of these recent and ongoing developments depend upon a complete and accurate understanding of the competitive market structure of the petroleum industry itself.

To the extent that the major oil companies which are making inroads into other energy fields are already in a noncompetitive posture in their principal dealings with each other, the potential anticompetitive consequences of their expansion into alternative fuels markets become all the more serious.

There are two fundamental economic problems which stem from integration of this type. First, interfuel integration imposes a constraint upon current or potential competitive interface between alternative fuels. This, in turn, creates the potential for harmful supply

conditions and abusive pricing policies because, especially in fuels markets today, there is a particularly strong tendency to establish the price of one fuel—say natural gas—on the basis of the equivalent cost per Btu of its alternatives.

For example, we are all aware of the petroleum industry's frequent claim that natural gas is underpriced—despite the fact that its price has tripled in the last 5 years—so long as gas is priced less per Btu than fuel oil. However, that superficially appealing argument obviously loses its credibility if the same sellers supply both, or—the situation that we are confronting—literally all fuels.

The petroleum industry today accounts for nearly 85 percent of our Nation's basic energy production. Oil accounts for about 50 percent of the industry's output, and natural gas accounts for about 35 percent.

In addition, major petroleum companies control many of our largest coal reserves. They also control the majority of our nuclear resources, and they are entering the nuclear equipment and nuclear fuel enrichment and reprocessing fields.

The 18 major fully integrated U.S. petroleum companies are listed in table 1 of my prepared statement. The table also indicates the extent to which these firms have become suppliers of other energy resources.

To a considerable extent, the expansion of petroleum industry interests into other energy fields such as coal and nuclear power has come about as the result of merger. A list of recent acquisitions of coal and uranium companies by petroleum firms is presented in table 2 of my prepared statement.

In addition to corporate mergers, firms in the petroleum industry have been active in acquiring coal and uranium leases directly from the Government and from private parties.

The key structural feature to keep in mind when assessing the market structure of the energy industry is that virtually all of the major corporate entities are tied together through a large number of joint venture arrangements and other types of intercorporate interlocks. Consequently, these firms cannot be viewed as wholly independent and unrelated market rivals.

Whether or not a market is competitive depends upon whether there is an adequate number of truly independent and self-motivated sellers. Without independence, self interests bind interdependent sellers together in the mutual pursuit of common objectives which are unlikely to conform to the broader public interest in sufficient supplies at reasonable prices.

Market concentration measures provide only very limited insight on the matter of seller dependence. If concentration is high, it is generally inferred that firms are not likely to behave independently, and that will undermine competition.

This elementary principal has, unfortunately, been turned on its head recently by industry spokesmen and others who are promoting price deregulation. They argue that because there are a substantial number of individual corporate entities in the petroleum industry, it can be presumed that competition is adequate.

That conclusion, however, is clearly erroneous if the various market participants perform as partners rather than entirely independent rivals.

I would like to spend a few moments discussing with you the results of some recent work we have done concerning the fuels reprocessing stage of the nuclear power industry as an example of the way in which the petroleum industry, in effect, dominates a very key link in the nuclear industry.

I focus on one aspect of the nuclear power industry, but the same types of conditions prevail and pertain to other sectors of that industry as well. And to a lesser, but substantial extent, in the coal industry.

This Nation's increasing problems with respect to its crude oil, natural gas and petroleum products needs was brought dramatically into focus by the Arab oil embargo in November 1973. That event sparked renewed interest in the rapid development of alternative energy supplies.

Consequently, more emphasis has been placed upon the nuclear industry to satisfy a growing proportion of our long-term, total energy requirements. This, in turn, has renewed interest in both the Government and private enterprise to complete the nuclear fuel cycle by developing a commercially viable spent nuclear fuel reprocessing industry. In light of recent experience, this objective could be more elusive than it might seem.

Nearly a decade ago, Nuclear Fuel Services—NFS—a subsidiary of Getty Oil Co., constructed the first spent nuclear fuel reprocessing facility at West Valley, N.Y. The Getty plant, which was originally designed to process 300 metric tons of spent fuel per year, operated between 1966 and 1972. Numerous operating problems were experienced during this period and the plant was closed in 1972.

Since that time, substantial modifications have been made and the plant is now scheduled to renew operations in 1978, or early 1979, at an increased annual capacity level of approximately 750 metric tons. That is a capacity level that would be roughly equivalent to service the fuel requirements of about thirty 1,000-megawatt nuclear powerplants.

Despite the problems encountered with the original plant, Getty now plans to construct an additional plant during the 1980's. A second attempt to develop spent fuel reprocessing capability was undertaken during the 1960's by the General Electric Co. GE, incidentally, is the only nonpetroleum company active in this phase of the nuclear industry.

In 1964, GE announced plans to construct a plant at Morris, Ill. The GE plant, which was scheduled for operation in 1971, was designed to process between 300 and 500 metric tons of fuel per year. Although construction of the Morris plant was virtually completed during the late 1960's, GE announced in 1974 that the plant would not be able to begin operations in its present form and canceled all existing reprocessing contracts with electric utilities.

The third and final reprocessing facility already constructed is located at Barnwell, S.C. This plant, which is referred to as the Agnes plant, was built through a joint venture between the Allied Chemical Co., which is the parent of Union Texas Petroleum, which is a major gas and oil producer, and the Gulf Oil Co. and Shell Oil. Gulf and Shell operate in this venture through their joint subsidiary, General Atomic. The Agnes plant, according to its owners, could commence reprocessing operations sometime in 1976 at a capacity level of nearly

1,500 metric tons per year. That is enough to service about sixty 1,000-megawatt nuclear plants.

Thus, the Allied-Gulf-Shell facility, which will be able to reprocess fuel for approximately sixty 1,000-megawatt nuclear powerplants, represents private enterprise's most extensive effort thus far to reprocess spent nuclear fuel on a full-scale basis.

While the Getty, GE, and Allied-Gulf-Shell ventures represent the only constructed facilities at the present time, there are also at least two additional potential entrants into the industry which should be included in any discussion of future growth and development. These potential entrants are the Atlantic Richfield Co. and Exxon Nuclear Co., a wholly owned subsidiary of Exxon, USA.

In the past, both Arco and Exxon have been engaged in rather extensive reprocessing R. & D. efforts. In fact, during the sixties when Allied, Gulf, and Shell were attempting to acquire customers for the Barnwell plant, they were faced with some potential rivalry from Arco which was then contemplating a similar venture.

While the Allied-Gulf-Shell group prevailed in that instance, Arco must still be viewed as a significant potential entrant into the industry because of the technical background that the company developed in the 1960's.

Exxon, on the other hand, has been conducting a number of plant siting studies and is now considered by many to be the industry's most likely new entrant. While, apparently, no major commitment of funds has yet been made, Exxon has already commenced design and development work. In light of both the magnitude of funds at Exxon's disposal and its previously expressed interest in reprocessing, Exxon must also be included in any listing of potential market participants.

One of the more salient observations to be drawn from this brief review of the current and probable participants in the nuclear fuel reprocessing industry is that the industry, at least during its formative years, is likely to be dominated by already large energy concerns. Alternative energy sources such as coal and petroleum have, historically, been in direct competition with nuclear fuels for electricity generation purposes.

Getty Oil, for example, is the Nation's 10th largest petroleum company with substantial oil and natural gas production interests throughout the Southwest and in California. In addition to production, Getty also engages extensively in petroleum transportation, refining, and marketing operations.

Similarly, Allied Chemical is the parent of Union Texas Petroleum, which is also a large oil producer and a maior supplier of natural gas to interstate pipelines. In addition, Union Texas is a refiner and marketer of petroleum products, and its parent, Allied, is also engaged in the production of coal.

Exxon, Gulf, and Shell are three of the five largest international petroleum companies with substantial investments in nearly all energy fields.

To illustrate, Exxon is the Nation's largest producer of crude oil, natural gas liquids, and natural gas. It has more refining capacity than any other domestic petroleum company, and it is the fifth largest holder of U.S. coal reserves. Exxon is also one of the top seven owners of uranium reserves, and early in October, announced plans to con-

struct a uranium fabrication facility, which may be the first privately owned fabrication plant in the United States.

The scoresheet for both Gulf and Shell is not significantly different. Both companies rank with Exxon, Texaco, and Standard Oil of California in most of their domestic petroleum operations, and both hold interests—although less significant in terms of size than Exxon's—in coal reserves. Like Exxon, both Shell and Gulf have extensive worldwide operations in all aspects of the energy industries.

Atlantic-Richfield is the eighth largest domestic petroleum company, and Arco also owns interests in both coal and uranium reserves.

The fact that the largest reprocessing facility constructed thus far is a joint venture between Allied, Gulf, and Shell is reflective of the way business historically has been conducted in the petroleum industry. In addition to joint petroleum exploration and production, these same firms are partners in their transportation operations.

For example, Allied. Gulf, Shell, Exxon, and Arco share ownership interests in the Dixie Pipeline Co., one of the largest product lines in the United States, together with seven other oil companies. Gulf and Shell are partners in the Explorer Pipeline. and Gulf, Shell, and Arco are joint owners of the Four Corners Pipe Line Co.

Inasmuch as it now appears that these major petroleum corporations together with GE will be the principal initial participants in the nuclear fuel reprocessing industry, their apparent historical preference to undertake projects jointly would indicate that this form of enterprise may tend to increase further as the nuclear fuels industry matures. Moreover, that structure pattern is likely to apply to all aspects of the nuclear industry, not just the fuel processing stage.

To illustrate. Getty Oil is engaged in uranium mining, milling, conversion, fuel fabrication, and reprocessing.

Similarly, Exxon mines and mills uranium, possesses a future capability to fabricate nuclear fuel, is considered by many to be the next entrant into both mixed-oxide fuel refabrication and spent fuel reprocessing, and recently announced its plans to be one of the first private entrants into the uranium enrichment industry. While the extent of vertical integration effected to date by Gulf, Shell, and Arco is not as extensive as Getty's and Exxon's, each of these firms is now involved in at least two distinct stages of the nuclear fuel cycle.

Thus, if we consider the vertical integration that now appears to be emerging in the nuclear industry, in combination with these same firms' large involvement in the production and sale of alternate fuels (e.g., crude oil, refined petroleum products, natural gas, gas liquids, geothermal power and coal), then it becomes less clear that competitive market conditions are likely to evolve as the industry develops beyond the 1980's.

In the last section of the prepared testimony I present a brief review of the way in which traditional policies, programs and institutions, which we have developed in this country to preserve and protect the competitive free market system, have in fact been a total failure with respect to their application to the petroleum industry. I conclude from this that——

Chairman KENNEDY. Well, just before getting into that, you have documented this increasing control by the oil companies over the nu-

clear power. That has been spelled out in very considerable detail. I suppose we have to ask what the result of this is.

Does it mean there is less production, or does it mean there is higher prices?

And if you had divestiture, what would be the difference?

Mr. WILSON. Well, the problem is bigger than the fact that four or five particular firms control the nuclear fuels reprocessing industry. If that were the only thing we observed I wouldn't be concerned about it. It is a new industry. It is an infant industry. And the fact that you have the potential of four or five or even three participants in it almost from ground zero is a lot more attractive in many ways than other industries that have emerged on the scene in this country in the last 30 or 40 years, such as the computer industry, for example, or the fast copying industry.

The problem is that the firms that are entering the industry are, first of all, partners. They are not independent corporate entities. They have a very large proportion of their interests in all of their enterprise areas tied up in each other's hip pockets. Each of these firms, with the exception of Exxon, owns the majority of their producing oil and gas wells jointly with other firms in the petroleum industry. Exxon's percentage is just a shade under 50 percent. It is between 45 and 50 percent.

They own the pipeline networks together. They own their international operations, such as Arabian American Oil Co., together. They are not even as independent as firms in industries where you have an acknowledged concentration problem like automobiles or aluminum or copper or some of the more obviously concentrated industries in the economy. The type of concentration you find here is concentration that takes place through partnership, through joint venture and through other types of interlocks, which result in one intertwined ball rather than a half dozen or a dozen or two dozen competitive enterprises.

So I perceive the problem in nuclear fuels as being a spinoff of the problem that is already apparent in petroleum. It is obvious that these same firms are not competitors in the true sense of the word in the petroleum industry.

One of the possibilities that we could benefit from in the future is encouraging some competition of an intermodal type between the various fuels.

But, obviously, to the extent that the same firm that have gained dominance in petroleum are able to gain dominnance in coal—which we could also include and document—and gain dominance in nuclear power, and expand their interest in the other areas that are just emerging on the scene, such as oil shale and geothermal and so on, then you are going to develop precisely the same problems industrywide that you have in petroleum itself.

Now, look at the petroleum industry. You can see what the problems are. The problems are price and supply.

Obviously, you cannot ignore the OPEC situation, but OPEC has not got any serious rival out there in the form of a buyer that has the consumer interest at heart. The OPEC cartel simply took over a cartel that had already been established and changed the management of it.

With regard to supply levels, I am absolutely certain that with regard to natural gas, for example, the supply problems that we are

facing in this country are to a large extent attributable to silly regulation—not to unnecessary regulation, for regulation is necessary, but it has been implemented in an absolutely absurd manner as far as encouraging production is concerned and stimulating production by creating economic incentives.

So you have got a bad regulatory situation and you have monopolized control over the resource, which, combined with each other, have produced a shortage situation and a situation of rapidly inflating prices in petroleum markets.

I perceive the same situation developing in coal and nuclear power. Indeed, because of the fact that we seemingly come around to the situation where we are willing to say that one fuel is underpriced as long as it is not priced as high as something else, and we have the same guy in control of the pricing of all of these fuels, well, we've got kind of an infinite spiral situation established with those same companies in control of each step along the way. Therefore, the price flexibility is going to be in one direction, and that is up.

Chairman KENNEDY. Well, tell me this. The Mayor has illustrated what happened out in San Francisco, which was controlled by the oil companies—I mean the geothermal was controlled by the oil companies.

Has your study led you to any conclusions about how they are functioning or operating at the present time? Are they operating in an arbitrary way?

Mr. WILSON. I cannot answer that question with regard to geothermal.

Are you asking with regard to petroleum and natural gas and coal?

Chairman KENNEDY. Yes.

Mr. WILSON. Well, if I can digress into natural gas, which is a favorite subject of mine, then I would be glad to do that.

If you are talking about the nuclear fuels industry itself, the problem I have identified there is structural at the present time. We are talking about an infant industry; we are not talking about something that is mature, established, and has a track record.

I don't know how far you want to get off the question of nuclear, but I can draw parallels for you.

Chairman KENNEDY. Your point then primarily in this area is that this is happening now in terms of the major oil companies and that structurally it is establishing some early warning systems for the consumer based upon what has happened in the past?

Mr. WILSON. Yes; I think it is pretty well established, Senator, that market performance ultimately comes out of and develops from the underlying structure that is established in an industry. You can expect good market performance of a competitive nature in an industry that is competitively structured. If you want good performance out of an industry that is not competitively structured, then the free market system is the one that is going to do the job.

Chairman KENNEDY. Has that been——

Mr. WILSON. You would have to have some sort of regulatory authority.

Chairman KENNEDY. Has that been as true in computers, I mean, with IBM? They seem to have a pretty strong monopoly and

you would have to give them I think pretty high marks in terms of technology, for instance.

Mr. WILSON. Well, everything is relative. There has certainly been more technological advancement in the computer industry than there has been in coal mining over the last 30 or 40 years. But that is not the type of comparison you would want to draw, or I would want to draw, I am sure. The question is how well has IBM done relative to its opportunities, relative to its technological opportunities? And one of our great problems is that we do not know an awful lot about that because we have not got any good comparisons to stack them up against. What we can do is look at the way in which they have tended to periodically control and even withhold the development of some technological innovations until such time as they were either forced to release it by Control Data or somebody else, or until such time as it became privately profitable for them to move forward.

You have the same problem with regard to Western Electric in the telephone industry. A.T. & T. has always said "our advancement record, our technological record has been outstanding, just compare us with the steel industry." But that is not really a relevant comparison unless you leave the competitive benchmark there—a yardstick.

So there is no real way in which we can determine whether progress is sufficient or insufficient.

Right now progress is very insufficient in nuclear fuels reprocessing. The industry is moving along very slowly. The Federal Government right at the present time is deciding whether to pump billions of dollars of Federal funds into nuclear fuel reprocessing because the oil industry firms that are currently in the industry are not moving forward at a pace that appears to be rapid enough to serve the needs of a developing nuclear energy industry.

There are all kinds of questions that one may ask and why that seems to be the case but——

Chairman KENNEDY. Why have nonoil companies not shown more interest in nuclear fuel reprocessing?

Mr. WILSON. I think that to a substantial extent it would go back to the question of obtaining a foothold. It is also of course related to the question of capital availability. There is no question there are other major firms in the economy that have the capital availability to get into it. I suppose A.T. & T. and GM could. But you have to remember that these major oil companies like Exxon, Getty, Shell, and Gulf control a substantial portion of our basic nuclear resource, that is, uranium. They have obtained control over a good deal of that by accident because over the last several decades they have been doing geological and seismic and drilling work for oil and natural gas and they found it then.

It is much the same reason that the petroleum industry dominates natural gas. They developed all of these gas supplies in the 1930's and 1940's, before they were necessary, in their oil-related work, and they developed a good deal of information, knowledge, geological information, and also resource control over other types of basic resources such as uranium.

This has, of course, led them into the current particular situation.

Now there is another motive, of course, and that is to the extent

that nuclear fuels or coal pose themselves as a competitive threat to oil and natural gas, the guy that wants to make a buck on oil or natural gas has the ability and the incentive to attempt to control potential competive threats.

Chairman KENNEDY. In your studies, have you been able to see where the increasing structural control by the major oil companies over the resources of uranium have actually meant less growth of nuclear power in competition for oil? Have you reached that conclusion?

Mr. WILSON. No; I cannot say I can document that conclusion at the present time. Again when we talk about nuclear fuel, when we talk about geothermal power, when we talk about oil shale, we are talking about preventive medicine. If you want a track record, if you want something where we can look back and say this is what happened as the result of the structural condition, you have to look at an industry that has a history.

And again, I invite you to look at natural gas.

Chairman KENNEDY. OK. Do you want to continue that last part?

Mr. WILSON. Well, I think I am essentially through. What I was going to conclude with was simply a statement to the effect that you are not going to be able to rely upon the two things that I suppose an awful lot of legislators and people in the administration would rely upon to deal with the problem. The two things that we hear about as being sufficient to deal with problems that may arise are: One, existing legislation that is on the books such as the Sherman Act and the Clayton Act and the amendments thereto, that is, implementing our antitrust laws as a means of preserving and protecting competition.

Anybody that is familiar with the history of antitrust enforcement vis-a-vis the petroleum industry over the last 30 or 40 years—and I have documented some of that in my prepared testimony—can understand very well why the petroleum industry would like to have us rely upon a continued application of these institutions. They simply do not work.

The second reliance is faith in free markets to serve and satisfy our energy needs and our energy requirements. We cannot rely on that. We can have free markets, but the term "free market" and "competitive market" are not synonymous. A free market without structural reform, without major changes in control, is going to be a free market that is dominated by private interests.

Chairman KENNEDY. Is it your feeling it has become more concentrated or less?

Mr. WILSON. It is becoming more concentrated, far more concentrated. If you just go back 13 or 15 years, you can see the total elimination of independent refiners in the petroleum industry. Go back and you will see the elimination of thousands of independent natural gas and oil producers.

Chairman KENNEDY. How much is the result of congressional action?

Mr. WILSON. Or congressional inaction, you mean?

Chairman KENNEDY. I mean by the various kinds of incentives or laws such as elimination of the depletion allowance for small firms.

Mr. WILSON. It depends on how you define congressional action. I do not want to be cute with you, but congressional inaction is

more to the point. We cannot attribute a great deal to specific congressional action, but the point is there has not been very much done. So you are clean on that score, but it does not mean very much.

Chairman KENNEDY. What about tax policies?

Mr. WILSON. Well tax policy in the petroleum industry has obviously tended to favor dominance by the integrated majors. I frequently like to draw some parallels between what happened in 1918 in the U.S. Senate and what is happening in 1974 and 1975. In 1918 when Senator Penrose of Pennsylvania first came forward with the notion of an oil depletion allowance, there were three Senators that had something to say in opposition to that: Norris, Borah, and La Follette. I think they mustered three or four other votes at that time to oppose oil depletion.

Well since then we have seen what oil depletion has done. It has given the major integrated firms a tremendous competitive advantage over nonintegrated firms in marketing and refining.

And because the integrated majors have been able to push their profits back into the production end of the business and take advantage of the tax write-offs there and have historically earned very minimal and in some cases even negative rates of return on marketing and refining operations, they threw the independents out of two aspects of the industry. So tax policy has been a tool whereby the major firms in the petroleum industry have gained dominance over the two aspects of the industry that have in the past imposed some competitive restraints on them——that is the marketing of gasoline and other types of fuel oil products, and the independent refiners who interjected competition every once in a while by producing more gasoline than the majors could sell.

Chairman KENNEDY. Let me make this point and get your reaction. There are people who contend the energy industry is relatively competitive because although each fuel is produced primarily by few companies, there are considerably more participants when you add together the oil companies and the mining companies and those producing uranium, so each fuel has competition.

And if you accept that line of reasoning, do you consider the energy industry as a whole to be excessively concentrated at present, or do you regard the growing concentration primarily as a future problem?

Mr. WILSON. I do not accept that line of reasoning. The reason for my rejection of it is a major thrust of a substantial portion of my prepared testimony which I just skipped over. It is true that if you look at the top four firms in the petroleum industry, that is Exxon and Texaco and SOCAL and Gulf, I guess and Mobil, the top four firms control between 35 and 40 percent of almost any aspect of petroleum you want to look at, such as production of natural gas, production of crude oil, refining capacity, marketing.

Now that compares very favorably with an industry like automobiles where the top four firms have control of 99.5 percent, or aluminum, where the top four firms control over 90 percent. But it is a bogus comparison. And the reason I say that is that the top firms in the petroleum industry are not independent. They are intertwined. They operate through their joint venture partnerships.

If you are interested in statistics, I can give you some statistics this morning that will show you the extent to which these top firms own

and operate their producing properties jointly with each other. They are not competitors or rivals. They are partners. And because they are partners, you in effect have a concentration ratio of 100 percent for one and not for four.

Now there are a lot of little firms in the industry but they do not exercise any influence over market prices or supply levels because they have to deal with the majors. You get into a policy such as Federal offshore oil and gas leasing, for example, and you do not get into that business unless you join together in either a very large consortium or you tie yourself to the apron strings of one or two major companies that have formed the consortium.

That type of entry into an industry does not contribute to competition. So if you count the numbers one way, you can get a large number of numbers; but because of the structure of the industry, these firms are simply not competitors with each other.

Chairman KENNEDY. I want to thank you very much; you have been very helpful. We look forward to examining your testimony with considerable interest. I want to thank you again.

[The prepared statement of Mr. Wilson follows:]

PREPARED STATEMENT OF JOHN W. WILSON

I would like to thank the Chairman and other members of the Subcommittee for inviting me to appear before you today to present testimony on a most important energy policy matter. My presentation this morning is divided into three parts. In part I, I identify some of the recent trends that lead me to believe that integrated control by major oil companies over competing energy fuels is becoming a serious problem in our economy. Part II is a background discussion concerning the competitive structure of the petroleum industry. I include this as part of my presentation because it is essential to understand the oil and gas situation before assessing the significance of the petroleum industry's expansion into other fuels. Part III is a brief case study of the petroleum industry's virtual dominance of the nuclear fuels processing industry. And, finally, in Part IV, I present an historical perspective in assessing the extent to which reliance upon existing instiutions or new legislation is the optimal course for the future.

I. INTRODUCTION

There is already a very substantial degree of horizontal interfuel integration that has taken place in the energy industries, and it appears that the trend is continuing. While those are the specific facts with which the Subcommittee is immediately concerned, it should be stressed that the competitive implications of these recent and ongoing developments depend upon a complete and accurate understanding of the competitive market structure of the petroleum industry itself. To the extent that the major oil companies which are making inroads into other energy fields are already in a non-competitive posture in their principal dealings with each other, the potential anticompetitive consequences of their expansion into alternative fuels markets become all the more serious.

There are two fundamental economic problems which stem from integration of this type. First, interfuel integration imposes a constraint upon current or potential competitive interface between alternative fuels. This, in turn, creates the potential for harmful supply conditions and abusive pricing policies because, especially in fuels markets today, there is a particularly strong tendency to establish the price of one fuel (say natural gas) on the basis of the equivalent cost per Btu of its alternatives. For example, we are all aware of the petroleum industry's frequent claim that natural gas is underpriced (despite the fact that its price has tripled in the last five years) so long as gas is priced less per Btu than fuel oil. However, that superficially appealing argument obviously loses its credibility if the same sellers supply both (or all) fuels.

The petroleum industry today accounts for nearly 85 percent of our nation's basic energy production. Oil accounts for about 50 percent of the industry's output, and natural gas accounts for about 35 percent. In addition, major

petroleum companies control many of our largest coal reserves. They also control the majority of our nuclear resources, and they are entering the nuclear equipment and nuclear fuel enrichment and reprocessing fields. The eighteen major fully integrated U.S. petroleum companies are listed in Table 1. The table also indicates the extent to which these firms have become suppliers of other energy resources.

To a considerable extent, the expansion of petroleum industry interests into other energy fields such as coal and nuclear power has come about by merger. A list of recent acquisitions of coal and uranium companies by petroleum firms is presented in Table 2. In addition to corporate mergers, firms in the petroleum industry have been active in acquiring coal and uranium leases directly from the government and from private parties. As was reported recently by Professor Reed Moyer of Michigan State University: [1]

TABLE 1.—DIVERSIFICATION IN THE ENERGY INDUSTRIES BY 18 MAJOR INTEGRATED PETROLEUM COMPANIES, RANKED BY ASSETS, AS OF 1973

[Dollars in millions]

Petroleum company	Total assets	Rank in assets	Energy industry				
			Natural gas	Oil shale	Coal	Uranium	Tar sands
Exxon	$25,079	1	X	X	X	X	X
Texaco	13,595	2	X	X	X	X	X
Mobil	10,069	3	X	X		X	
Gulf	10,074	4	X	X	X	X	X
Standard Oil (Calif.)	9,082	5	X	X			X
Standard Oil (Ind.)	7,018	6	X	X		X	X
Shell [1]	5,381	7	X	X	X	X	X
Atlantic Richfield	5,109	8	X	X	X	X	X
Continental Oil	3,693	9	X	X	X	X	X
Phillips Petr	3,607	10	X	X		X	
Sun Oil	3,382	11	X	X	X	X	X
Union Oil	2,909	12	X	X	X	X	
Cities Service	2,660	13	X	X		X	X
Getty [2]	2,335	14	X	X		X	
Standard Oil (Ohio) [3]	1,963	15	X		X	X	
Marathon	1,572	16	X	X			
Ashland	1,437	17	X	X	X	X	
Amerada Hess	862	18	X			X	

[1] Royal Dutch/Shell group has total assets of £ 9,816,000,000.
[2] Getty Oil Co. owns 72.53 percent of Skelly Oil Co.
[3] British Petroleum, which owns a 25 percent interest in Standard Oil (Ohio) with the right to earn up to a 54 percent nterest, has total assets of $10,403,000,000.

[1] Hearings, Senate Interior Committee: The Market Performance and Competition in the Petroleum Industry, December 5 and 6, 1973.

TABLE 2.—RECENT MERGERS BETWEEN PETROLEUM COMPANIES AND FIRMS IN OTHER ENERGY INDUSTRIES

Date	Acquiring firm	Acquired firm
1955	Continental Oil [1]	American Coal.
1955	do.[1]	Atwater Wm. & Co. (coal).
1955	Occidental Petroleum [2]	Pond Creek Pocahontas (coal).
1955	El Paso Natural Gas	Arrowhead Uranium.
1956	Continental Oil [1]	Little Sister Coal.
1956	do.[1]	Pocahontas Fuel Co. (coal).
1956	Occidental Petroleum [3]	Algoma Coal Coke.
1956	do.[2]	Red Jacket Coal.
1956	Phillips Petroleum	Holly Minerals (uranium).
1957	Standard Oil of Ohio [3]	Coal Processing Co.
1958	Occidental Petroleum [2]	Guyan Eagle (coal).
1959	do.[2]	Elk Creek (coal).
1960	Kerr-McGee	American Lake Uranium.
1961	do	Guyan Eagle (coal).
1961	do	Lakeview Mines (uranium).
1962	Continental Oil [1]	Truax-Traes Coal.
1962	Kerr-McGee	Ambrosia Lake Uranium.
1962	do	Spencer Chemical (uranium).
1962	El Paso Natural Gas	Rare Metals Corp. (uranium).
1963	Continental Oil [1]	Crozer Coal & Land.
1963	do.[1]	Reis Coal.
1963	Occidental Petroleum	Western Kentucky Coal.
1964	Gulf Oil	Pittsburgh & Midway Coal.
1964	Kerr-McGee	Kermac Nuclear Fuels.
1965	Standard Oil of Ohio [3]	Enos Coal.
1966	Occidental Petroleum [2]	Evans Elkhorn (coal).
1966	Continental Oil	Consolidated Coal.
1968	Occidental Petroleum	Island Creek Coal.
1968	Standard Oil of Ohio	Old Ben Coal.
1968	Belco Petroleum	Hawley Fuel Corp. (coal).
1969	Occidental Petroleum	Manst Coal & Coke.
1969	Western Transmission Co	Canterbury Coal Co.
1970	Gulf Oil [4]	C. & K. Coal.
1970	Zapata Petroleum	Boone County Coal.
1970	Falcon Seaboard Petroleum	Breathitt County Coal.
1970	do	Black Eagle Coal.
1970	do	Mt. Top Stripping & Pine Bluff Auger (coal).
1970	McCulloch Oil	Kingdom Come Coal.
1970	do	Maxietta Coal.
1970	do	No. 7 Corp. (coal).
1970	U.S. Natural Resources	Twilight Industries (coal).
Date of merger or formation not known.	Ashland Oil	Arch Minerals (coal).
Do	Diamond Shamrock	Pickards Mather & Co. (coal).
Do	Sun Oil	Cordero Mining (coal).
Do	Exxon Corp	Monterrey Coal.
Do	Champlin Petroleum	Union Pacific Coal.
Do	Newmont Oil	Dawn Mining (uranium).
Do	Kerr-McGee (50 percent)	KGS-JV (uranium).
Do	Getty Oil (33 percent)	Do.
Do	Skelly Oil (17 percent)	Do.
Do	Kerr-McGee (50 percent)	Petrotonics (uranium).
Do	Getty Oil (33 percent)	Do.
Do	Skelly Oil (17 percent)	Do.
Do	Texaco	Texas-Zinc (uranium).
Do	Atlantic Richfield	NUMEC (uranium).
Do	Exxon	Jersey Nuclear.

[1] Acquired by Consolidation Coal.
[2] Acquired by Island Creek Coal.
[3] Acquired by Old Ben Coal.
[4] Acquired by Pittsburgh & Midway Coal.

The oil companies also have been active in acquiring substantial reserves of low-sulfur strippable western coal. By April 1971, oil companies had acquired leases on about 25 percent of coal land then leased by the Federal Government. They were producing on only 4 of 77 leases. Much of the unused coal reserves were undoubtedly being withheld from the market for future liquefaction . . .

Control of this type may seem unimportant in view of the vastly greater quantity of available coal reserves in the country. Much of the Nation's coal reserves, however, are not economically minable under existing conditions.

Thus the oil companies' strategically placed Western coal reserves give them a strong competitive position.

The top five oil companies are among our nation's ten largest industrial corporations, and twelve are among the twenty-five largest. Because of the industry's size and scope and because of the critical role of energy in modern life, the policies, actions and performance of these firms affect virtually every aspect of our nation's economy, and they deeply influence the welfare of every energy consumer and every purchaser of industrial or commercial products whose manufacture and transportation depend upon the availability and price of energy.

The key structural feature to keep in mind when assessing the market structure of the energy industry is that virtually all of the major corporate entities are tied together through a large number of joint venture arrangements and other types of intercorporate interlocks. Consequently, these firms cannot be viewed as wholly independent and unrelated market rivals.

Whether or not a market is competitive depends upon whether there is an adequate number of truly independent and self-motivated sellers. Without independence self interests bind interdependent sellers together in the mutual pursuit of common objectives which are unlikely to conform to the broader public interest in sufficient supplies at reasonable prices.

Market concentration measures provide only very limited insight on the matter of seller dependence. If concentration is high, it is generally inferred that firms are not likely to behave independently, and that will undermine competition. This elementary principal has, unfortunately, been turned on its head recently by industry spokesmen and others who are promoting price deregulation. They argue that because there is a substantial number of individual corporate entities in the petroleum industry, it can be presumed that competition is adequate. That conclusion, however, is clearly erroneous if the various market participants perform as partners rather than entirely independent rivals.

II. BACKGROUND ON INDUSTRY STRUCTURE

Most U.S. oil and gas production is now done through extensive joint venture partnership arrangements. In addition, crude oil and refined product transportation is carried out by joint venture pipeline enterprises, and refining and marketing operations are frequently dependent upon crude oil and product exchange agreements with other companies.

Most oil and gas production, both domestically and abroad, is now done through extensive joint venture partnership arrangements. Most producing oil and gas wells are owned jointly rather than individually. Additionally, both exploratory drilling and developmental drilling for oil and gas is more frequently undertaken through partnership arrangements rather than by independent corporate enterprises.

Also, lease acquisition (including federal offshore lease sales) is generally undertaken as a joint endeavor. Consequently, virtually all aspects of oil and gas production involve substantial joint venture partnership activity among the various corporate entities which constitute the industry. Both the large vertically integrated companies and smaller independent producers have joined together in their common endeavors. Every significant oil company is involved in various forms of joint pursuits with the other majors. The industry's largest integrated firms such as Exxon, Texaco, Mobil, Gulf, Socal, Amoco, and Continental share joint partnership interests with each other and with other big and small producers alike, and as would be logically expected, a given company's partnership patterns tend to carry over from exploration to development to production, and there is great similarity between partnership patterns in crude oil and natural gas.

In addition, most major integrated petroleum companies hold joint interests with each other in the transportation network that moves crude oil and refined products from producing regions to refineries and markets. These jointly owned

and operated links between producing, refining, and marketing operations (about three-fourths of all crude and one-fourth of refined products are transported by pipeline) mean that the various partners' activities must be coordinated if the whole vertically integrated system is to function efficiently. Moreover, this situation suggests that firms have reasonably good information concerning the magnitude and pattern of everyone else's vertically integrated operations. In addition, smaller independent crude oil producers must rely upon the majors who own the pipelines, and independent refiners must similarly gain access to these shipments if they are to survive. Moreover, the major oil companies also have substantial ownership and lease control over the world tanker fleet, the principal alternative to pipeline transport.

In contrast to the ownership pattern in the oil pipeline industry, natural gas pipelines are typically owned by a single corporate entity. Some, however, are owned in whole or in part by major oil companies, and even those which are not so owned are now involved in oil and gas exploration and production joint ventures with the major producers.

For example, since 1970, Texas Eastern, a major East Coast natural gas pipeline, has acquired interests in a large number of major offshore leases along with Standard of Indiana, Union Oil, Marathon, Signal Oil, Amerada Hess and Louisiana Land and Exploration Company. Similarly, United Gas Pipeline, the largest system in the Southeast, has acquired interests in many leases with Exxon, Texaco, Mobil, Ashland, Mesa, Getty, Cities Service, Occidental and others. In all, the major interstate pipelines have obtained working interests in nearly 50 percent of federally leased offshore oil and gas property during the last four years. Their acquisition expenditures have totaled well over $1 billion or about 20 percent of the total lease sales receipts of the federal government. Since most of these pipeline companies operate in monopoly franchised markets and have "purchased gas adjustment clauses" which permit them to automatically pass through higher wellhead prices to their customers, and since their production earnings are not subject to a rate of return constraint, they have a clear and growing interest in higher field prices for natural gas. Thus, it is doubtful that consumers would be protected by free market bargains struck between producers and pipelines in the unregulated pricing of natural gas.

In addition to these operational interlocks, major petroleum firms have extensive joint foreign operations with each other; they also own the great majorty of this nation's natural gas processing plants jointly; they are significantly dependent upon each other for crude oil, gasoline and other product exchanges; and there are a significant number of indirect (and some direct) interlocks between the Board of Directors of major oil and gas companies.

It is, of course, not the case that any single one of the thousands of interlocks or joint venture arrangements which permeate the petroleum industry in itself undermines workable competition between the joint venture partners. Nor would it be correct to conclude merely from their existence that joint venture interties are necessarily collusive arrangements consciously aimed at restraining competitive conduct. Rather, motivation aside, it is the total impact of all of the individual partnerships which constitutes the petroleum industry's unique form of structural integration and which dictates the industry's supply and price performance. Regardless of the specific motives which might well justify any given joint venture, because of the extensive and wide-spread nature of mutual intercorporate interests, it cannot be presumed that the competitive result will be the same as if the proprietary and commercial interests of each firm were independent of and competitively opposed to the self-interests of the other market participants. In short, when the entire mosaic is viewed in context, the extent to which these interlocks dominate the industry's structure is undeniable.

III. NUCLEAR FUEL: AN EXAMPLE OF INTEGRATED CONTROL

This nation's increasing problems with respect to its crude oil, natural gas and petroleum products needs was brought dramatically into focus by the Arab oil embargo in November, 1973. That event sparked renewed interest in the rapid development of alternative energy supplies. Consequently, more emphasis has been placed upon the nuclear industry to satisfy a growing proportion of our long-term, total energy requirements. This, in turn, has renewed interest in both the government and private enterprise to complete the nuclear fuel cycle by developing a commercially viable spent nuclear fuel reprocessing industry. In light of recent experience, this objective could be more elusive than it might seem.

Nearly a decade ago, Nuclear Fuel Services (NFS), a subsidiary of Getty Oil Company, constructed the first spent nuclear fuel reprocessing facility at West Valley, New York. The Getty plant, which was originally designed to process 300 metric tons of spent fuel per year, operated between 1966 and 1972. Numerous operating problems were experienced during this period and the plant was closed in 1972. Since that time, substantial modifications have been made and the plant is now scheduled to renew operations in 1978 (or early 1979) at an increased annual capacity level of approximately 750 metric tons. Despite the problems encountered with the original plant, Getty now plans to construct an additional plant during the 1980's.

A second attempt to develop spent fuel reprocessing capability was undertaken during the 1960's by the General Electric Company (GE). In 1964, GE announced plans to construct a plant at Morris, Illinois. The GE plant, which was scheduled for operation in 1971, was designed to process between 300 and 500 metric tons of fuel per year. Although construction of the Morris plant was virtually completed during the late 1960's, GE announced in 1974 that the plant would not be able to begin operations in its present form and cancelled all existing reprocessing contracts with its customers.

The third and final reprocessing facility already constructed is located at Barnwell, South Carolina. This plant (AGNS) was built through a joint venture between Allied Chemical Company,[2] Gulf Oil, and Shell Oil (Gulf and Shell operate in this venture through their joint subsidiary, General Atomic). The AGNS plant, according to its owners, could commence reprocessing operations sometime in 1976 at a capacity level of nearly 1500 metric tons per year. Thus, the Allied-Gulf-Shell facility (which will be able to reprocess fuel for approximately sixty 1,000 MW nuclear power plants) represents private enterprise's most extensive effort thus far to reprocess spent nuclear fuel on a full-scale basis.

While the Getty, GE, and Allied-Gulf-Shell ventures represent the only constructed facilities at the present time, there are also at least two additional potential entrants into the industry which should be included in any discussion of future growth and development. These potential entrants are the Atlantic Richfield Company and Exxon Nuclear Co. (a wholly owned subsidiary of Exxon, U.S.A.).

In the past, both Arco and Exxon have been engaged in rather extensive reprocessing R&D efforts. In fact, during the sixties when Allied, Gulf and Shell were attempting to acquire customers for the Barnwell plant, they were faced with some potential rivalry from Arco, which was then contemplating a similar venture. While the Allied-Gulf-Shell group prevailed in that instance, Arco must still be viewed as a significant potential entrant into the industry because of the technical background that the Company developed in the 1960's.

Exxon, on the other hand, has been conducting a number of plant siting studies and is now considered by many to be the industry's most likely new entrant. While, apparently, no major commitment of funds has yet been made, Exxon has already commenced design and development work. In light of both the magnitude of funds at Exxon's disposal and its previously expressed interest in reprocessing, Exxon must also be included in any listing of potential market participants.

One of the more salient observations to be drawn from the brief review of the current and probable participants in the nuclear fuel reprocessing industry is that the industry, at least during its formative years, is likely to be dominated by already large energy concerns. Alternative energy sources such as coal and petroleum have, historically, been in direct competition with nuclear fuels for electricity generation purposes. Getty Oil, for example, is the nation's tenth largest petroleum company with substantial oil and natural gas production interests throughout the Southwest and in California. In addition to production, Getty also engages extensively in petroleum transportation, refining and marketing operations. Similarly, Allied Chemical is the parent of Union Texas Petroleum, which is also a large oil producer and a major supplier of natural gas to interstate pipelines. In addition, Union Texas is a refiner and marketer of petroleum products, and Allied is also engaged in the production of coal. Exxon, Gulf, and Shell are three of the five largest international petroleum companies with substantial investments in nearly all energy fields. To illustrate, Exxon is the nation's largest producer of crude oil, natural gas liquids, and natural gas. It has more refining capacity than any other domestic petroleum company, and it

[2] Union Texas Petroleum is a major subsidiary of Allied.

is the fifth largest holder of U.S. coal reserves. Exxon is also one of the top seven owners of uranium reserves, and early in October, announced plans to construct a uranium fabrication facility.

The scoresheet for both Gulf and Shell is not significantly different. Both companies rank with Exxon, Texaco and Standard Oil of California in most of their domestic petroleum operations, and both hold interests (although less significant in terms of size than Exxon's) in coal reserves. Like Exxon, both Shell and Gulf have extensive worldwide operations in all aspects of the energy industries.

Atlantic-Richfield is the eighth largest domestic petroleum company, and Arco also owns interests in both coal and uranium reserves.

The fact that the largest reprocessing facility constructed thus far is a joint venture (between Allied, Gulf and Shell) is reflective of the way business historically has been conducted in the petroleum industry. In addition to joint petroleum exploration and production, these same firms are partners in their transportation operations. For example, Allied, Gulf, Shell, Exxon, and Arco share ownership interests in the Dixie Pipeline Company (one of the largest product lines in the U.S.) together with seven other oil companies. Gulf and Shell are partners in the Explorer Pipeline, and Gulf, Shell, and Arco are joint owners of the Four Corners Pipe Line Company.

Inasmuch as it now appears that these major petroleum corporations together with GE, will be the principal initial participants in the nuclear fuel reprocessing industry, their apparent historical preference to undertake projects jointly would indicate that this form of enterprise may tend to increase further as the nuclear fuels industry matures. Moreover that structural pattern is likely to apply to all aspects of the nuclear industry—not just the fuel processing stage.

To illustrate, Getty Oil is engaged in uranium mining, milling conversion, fuel fabrication and reprocessing. Similarly, Exxon mines and mills uranium, possesses a future capability to fabricate nuclear fuel. is considered by many to be the next entrant into both mixed-oxide fuel refabrication and spent fuel reprocessing, and recently announced its plans to be one of the first private entrants into the uranium enrichment industry. While the extent of vertical integration effected to date by Gulf, Shell, and Arco is not as extensive as Getty's and Exxon's, each of these firms is now involved in at least two distinct stages of the nuclear fuel cycle.

Thus, if we consider the vertical integration that now appears to be emerging in the nuclear industry in combination with these same firms' large involvement in the production and sale of alternate fuels (e.g., crude oil, refined petroleum products, natural gas, gas liquids, geothermal power, and coal), then it becomes less clear that competitive market conditions are likely to evolve as the industry develops beyond the 1980's.

IV. THE NEED FOR NEW LEGISLATION

The principal conclusion which emerges from these underlying facts is that superficial analysis which compares the energy sector with other industries is not likely to result in optimal public policy decisions. Nevertheless, analysis of that type continues to be thrust upon policy makers who must decide whether deregulation of petroleum markets or improved public control and reform offers the most reasonable solution to present energy supply and price difficulties.

The fundamental problem, from a national policy viewpoint. is that without a competitive infrastructure. market forces simply cannot be relied upon to curb inflation and unemployment or to allocate our nation's economic resources in an equitable and efficient manner. If non-competitive circumstances persist, directly imposed and effectively administered market controls will be essential to the restoration of economic order in the energy sector. The only alternative, if we hope to establish a stable economic equilibrium within the context of an unregulated free market economy, is to assure that private industry is sufficiently competitive so that market forces can function in a positive manner, consistent with the public interest.

A frequent assertion in this regard is that we already have antitrust laws on the books. and that if there is really a serious problem. the Justice Department or the FTC will deal with it: no additional legislative mandate or specific direction is necessary. History—even recent history—however, belies that contention.

The last major petroleum industry antitrust case brought by the Justice Department occurred during the 1930's, and withered away after more than twenty years without any significant remedies. On that occasion (i.e., the American Petroleum Institute or "Mother Hubbard" case), the government charged 22 major integrated oil companies and 379 of their subsidiaries with monopolizing crude oil production, transportation and marketing. The monopoly and conspiracy charges against the majors included predatory and discriminatory conduct against independent operators, tying arrangements, exclusive dealing and a variety of other anticompetitive practices which were illegal under the Sherman and Clayton Antitrust Acts and the Elkins Act. In addition to injunctive relief against these oil industry practices, the Justice Department's suit sought divestiture of the transportation and marketing operations of vertically integrated firms. That action was never taken. As World War II intervened, Attorney General Jackson worked out a consent decree with the advice of the oil advisory committee of the Council for National Defense. Nine of the eleven committee members were connected with either Standard Oil or Shell, both defendants in the case.

Following the Federal Trade Commission Staff Report on the international oil cartel published in the early 1950's, a Federal grand jury was empaneled in 1952 to investigate criminal antitrust charges against the multi-national oil companies. President Truman offered to dismiss the grand jury and substitute a civil case instead if the companies would voluntarily supply documents subpoenaed by the government. That offer was refused by Standard Oil's lawyer Arthur Dean on grounds that the information sought by antitrust authorities would help the Communist cause. In 1953 Dean's law partner, John Foster Dulles, became Secretary of State, and the new administration dismissed the grand jury investigation citing "national security reasons."

In 1957 when twenty-nine U.S. oil companies were accused of using the Suez crisis as an opportunity to raise gasoline prices, another Federal grand jury empaneled in Virginia returned antitrust price-fixing indictments. The case was then transferred to Tulsa, where Judge Royce A. Savage dismissed all charges against the companies despite the fact that executive diaries showed that telephone meetings had taken place and companies knew what price levels others were going to invoke prior to their public announcements. One year later Judge Savage resigned from the bench to become a vice president and director of Gulf Oil, one of the defendants in the case.

In 1962, the Antitrust Division undertook an investigation of the potential anticompetitive consequences of the Colonial Pipeline joint venture involving Mobil, Texaco, Gulf, Standard of Indiana, Atlantic Richfield, Cities Service, Continental, Union Oil and Sohio. Thirteen years later, the Justice Department's investigation is still "active."

More recently, it was reported that in 1972 the Antitrust Division prepared civil investigation demands to probe potential antitrust problems pertaining to the Trans-Alaska Pipeline which will be largely controlled by Exxon, B.P., and Atlantic Richfield in proportion to their control over Alaskan oil reserves. Senate testimony reports that this investigation was vetoed by the Attorney General, who was allegedly concerned about efforts to collect over $3 million from oil interests for the reelection campaign. When he learned of the Division proposed petroleum investigation it is said that the Attorney General directed his antitrust chief that "in view of what is going on, this is not the time." [3]

Even as we discuss these matters today, all visible indications suggest that the FTC's recently celebrated "Exxon Case" has, at least, been severely derailed, and may well be dead. In short, traditional tools have simply not worked. The petroluem industry has always had sufficient strength, influence, and perserverence to overpower, outmaneuver, or outlast any conventional assault upon its entrenched position. Indeed, it is highly naive to believe that anything short of new legislation will be sufficient to deal effectively with market structure problems in the energy industry.

There is today a good deal of discussion about letting "free market forces" resolve our energy woes. I support the concept of free competition in principle, but it is clear that a simple "hands off" policy, by itself, won't achieve the desired

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[3] See testimony of Mark Green in hearings on Market Performance and Competition in the Petroleum Industry before the Special Subcommittee on Integrated Oil Operations of the Senate Committee on Interior and Insular Affairs, 93d Cong., 1st sess., pt. 1, at 375 (1973).

end. The establishment of a truly competitive structure is an indispensable prerequisite to a workably efficient free market. What seems to be missing in many current appeals is an adequate appreciation for the fact that "free markets" and "competitive markets" are not necessarily synonymous concepts. Particularly in the petroleum industry, where short-run supply and demand are price inelastic, a noncompetitive free market is likely to produce grossly suboptimal allocative and distributional results.

Quite obviously, to the extent that the same companies control both petroleum products such as oil and natural gas as well as coal, uranium, oil shale, and geothermal power, there is no way that interfuel rivalry will work out to the benefit of energy consumers.

Chairman KENNEDY. Our next witness is Mr. C. Howard Hardesty, Jr., vice chairman of Continental Oil Co. and prior to 1968, he was executive vice president of Consolidation Coal Co. We appreciate your appearance here. We know you have a plane to catch and have adjusted your schedule to be with us. We appreciate it very much.

STATEMENT OF C. HOWARD HARDESTY, JR., VICE CHAIRMAN, CONTINENTAL OIL CO.

Mr. HARDESTY. Senator, I appreciate the opportunity to express the views of my company on the question of horizontal integration in energy. As you are all aware, our company currently produces and sells oil, gas, coal, and uranium. We can thus be rightly called an energy company. And to the extent that this description represents the success of a long-term corporate policy to satisfy the legitimate energy needs of our customers in a constantly changing environment, it is a title we are proud of.

To some, however, the concept of "energy companies" seems to pose a serious threat to the competitive nature of our economy.

I have filed a prepared statement with the subcommittee. It sets forth in some detail Continental Oil Co.'s views on horizontal integration. Today I would like to summarize those views, Senator, on two issues which I think are at the heart of the matter. The first is our Nation's critical need for an expanded domestic energy base. That is so great that new interests with a willingness and a capacity to contribute to that expansion should be welcome.

Second, each of the different energy fields operates competitively. Horizontal integration poses no threat to this. In fact it has stimulated competition within each energy industry.

At the midpoint of this century—and Continental has just celebrated its 100th anniversary—our business activities were confined to petroleum operations on a modest scale within several regions of the United States. Any business entity survives by adopting to changing circumstances.

And since 1950 supply-and-demand patterns in energy have undergone massive transformations. The oil industry was challenged by artificially low prices for natural gas and sharply limited U.S. onshore exploratory potential on the one hand; and a massive postwar U.S. energy appetite on the other.

Our corporate appraisal of the outlook for domestic oil and gas activities promised a series of diversification moves. As a first step we, in joint venture with other companies, helped to finance the development of our offshore oil industry in the Gulf of Mexico. Attrac-

tive exploratory prospects and lower development costs induced us to carry the search for oil beyond our borders. And at this moment we are participating in production operations in Libya, Iran, and the non-OPEC nations of Dubai, Norway, and the United Kingdom.

This development took place with the active encouragement of government. I continue to hold the very strong conviction that our national interests have been well served by an American presence in the international petroleum industry.

Conoco in the 1960's began to develop a petrochemical group as a logical extension of its oil activities. Our chemical activities are today responsive to customer demands and they provide a strong building block for the future.

And as the anticipated demand for electricity grew, we were attracted to markets for fuel for electricity generation. In 1966 we acquired Consolidation Coal Co. and shortly thereafter started uranium exploration, and uranium exploration group which found sufficient reserves to start atomic milling operations in 1972.

Why have we done these things? Coal and uranium of course attracted us with the prospect of investment opportunities on behalf of our stockholders, but why did we not move into the business of making toys, publishing newspapers, building ships, making automobiles, or as some would have it today, simply liquidate and go out of business? Well, the answer is simple, Senator. We have been aiming to apply to our coal and to our uranium activities many of the strengths and many of the disciplines which were gained through long, difficult experiences in the petroleum industry.

So we do think we do a better job in these newer business areas. Highly developed exploration and mining technologies, a willingness to undertake high-risk ventures, expertise in project financing and economic planning, and most important of all, highly skilled and motivated people are the things which have made us, we think, a better coal company and a better uranium company. And I think the subcommittee should consider that if we had not moved into these areas, who would have?

And I do not for one moment contend that only oil companies are capable of developing nonoil sources of energy for this country. I do suggest, however, that the record clearly shows that they have done far more in this regard than anyone else. And in so doing, they are helping to fulfill one of our most important national priorities which is increased domestic supplies of energy.

Measured by any yardstick, the structure and performance of the oil, coal, and uranium industries indicate that each is highly competitive. Concentration, prices, profit, ease of entry, technological innovation, all of the factors which are most frequently considered by students of competitiveness confirm this statement. I have discussed in my written statement each of these factors. But let us look briefly at two of the most widely accepted measurements, namely industry structure and performance.

Industry performance as measured by innovation, profits and ease of entry clearly indicate the petroleum industry is highly competitive. Contrary to all headlines in Washington——

Chairman KENNEDY. Could you just pause for a moment? I have a phone call.

[A brief recess was taken.]

Chairman KENNEDY. You may proceed.

Mr. HARDESTY. Thank you.

Chairman KENNEDY. You know, one of the things that could fit right into it is this. Accepting all the points that you have made in terms of the desirability, the interest, and the willingness to face some of the challenges that exist in some of these other areas for the development of alternative sources of energy, how do you think the public interest is really protected from this kind of a danger which has been talked about this morning? If you do control the various sources of alternative energy, as it has been suggested, then the public interest is not as protected as if there were real competition within the industry and between the industries. How in terms of a conceptual point of view, Mr. Hardesty, do you handle that?

Mr. HARDESTY. Well, first I have to go first right to your very question in which you use the word "control." And from a conceptual point of view, if there was a control by a limited number of companies of any of these energy sources, I would not think the public interest would be served. I think what we are clearly pointing out, Senator, and it is a continued part of my statement here, is that by any measure that the economists, that the students, that the academicians and the rest of them have put up and also the courts, for determining competitiveness, these industries are highly competitive.

Chairman KENNEDY. "These" meaning what?

Mr. HARDESTY. Well, let us look at them specifically and the degrees of concentration and the two tests. I was coming to those tests in my prepared statement. It is a very large part of the prepared text which I have filed with your subcommittee. The simple fact of the matter is that there is no point of control either in the oil or in the coal industry or in the uranium industry. The industry structure itself is diverse and widespread. I have heard this morning several times that oil companies control the coal industry. Well, I simply submit that the production of 18 percent of the coal being produced in this country, well that is not controlled. And that 18 percent is by the oil companies, and the oil companies compete against one another, and they compete against other coal companies. This is true.

And what we are witnessing today is a massive exploratory undertaking also for uranium. And the concentration that exists—and I do not think it is high nor is it against the public interest—it is becoming more diffused and disbursed. We as a company were not in that game until 1965 but since that time, have spent over $50 million, and we have drilled 55.000 holes and have drilled more than 19 million feet to find uranium. Right now, we are producing and milling about 1 million pounds a year. That, to my opinion, has added to a rather concentrated industry structure that existed. And as I say, I think this will happen in a more expanded way in the future. And I think this is good for competition.

Chairman KENNEDY. Well, how are you going to deal with the alternative competition among the sources of energy? I mean, if you go ahead and are into these various other areas of energy production and you find out later on, in another 3 years, that it would be a good deal more lucrative to focus your attention in terms of the production of uranium rather than the production of coal, well, what will happen to that alternative source of energy?

Mr. HARDESTY. Well, I think——

Chairman KENNEDY. I mean, you have responsibilities to your stockholders and to those who have investments. It would seem to me you would want to maximize your profit structure. I mean, it is only natural. It would seem to me you would maximize your profit structure in areas where there is the greatest opportunity for profit. And I am just wondering what is going to happen.

And if that is the case—and it may very well be—then you would be running pellmell in terms of developing alternative sources in a number of different areas. I mean, some of those are going to be quite clearly demonstrated to be more profitable than others.

We see a trend and movement in which the oil companies are into the coal area, and the oil companies are into other areas, like the production of uranium. You say the percentage is 18 percent now in terms of coal production, but that is the whole trend and movement, and it is perceivable. But when you find out, in 3 or 5 or 10 years, that some of these sources are going to be a good deal more lucrative in terms of the profits to the companies, then how are we going to have real competition?

Mr. HARDESTY. Your question gives me two problems, Senator. But let's go first of all to the interfuel competition. And then let's think about our problem 10 years down the road.

Chairman KENNEDY. All right.

Mr. HARDESTY. If you take a careful look at the energy segments that exist today, there is really limited interfuel competition. We can't use nuclear power for an automobile nor can we use gasoline for a boiler. There is in the transportation industry limited interfuel competition, if any.

In space heating, there has been some competition, but our natural gas supplies are not capable really of reaching out for the markets in the future. In the field of electricity generation, there is some interfuel competition that has to be pretty carefully looked at because in each and every one of the instances as you approach the construction of a large major electric generating plant, your plans get tied down to the fuel supply at the outset. And you will be engaged in long-term contracts. And at that moment in time, you have the opportunity to shop around and to buy and to try to find the most competitive consumer-serving fuel at that moment and project it over the future. Later on, you do not have that option.

Now, the question of what may happen, well, I think each fuel is a highly competitive undertaking today. What may happen down the road 10 years from now is all conjecture. But we are seeing right at this moment in our experience out in the field a high degree of competitiveness, of people entering into it, basically in response to the need in this country. And my guess is that when we meet 10 years from now, even if this subcommittee did nothing, you would have a more dispersed and diffused and competitive industry than you have today.

But I think to enact legislation and think in terms of trying to really come to grips with this problem, Senator, today on what may happen 10 years from now is really conjecture at best.

Chairman KENNEDY. Well, if we look to the past and if we take an area that is of such great importance up in my part of the country, and that is this rapid rail transportation or bus transportation or public transportation. I think with any kind of fair review, you can

see what General Motors did in terms of bottling up this whole area of technology for a number of years. GM is competitive in terms of GM versus Chrysler or GM versus Ford, but with the enormous kinds of influence they have and resources they have, at least in terms of rapid rail, they could have developed public transportation, but it was virtually sidetracked. And there have been important antitrust cases on that.

And you can argue back and forth in terms of the particular facts of the situation, but here you had competition in one aspect, that is GM against Chrysler, but you found that the major automobile companies were all really competing in one very narrow area; that is, they all got big cars, but the real alternative source of transportation was effectively sidetracked. And there are many economists, who believe that one of the principal reasons for that has been that the automobile companies saw that they could make a greater profit in the area of automobile transportation.

Now, aren't we entitled to look to the past in terms of economic structure to try to guide us in terms of the future? I don't have any question with regard to you personally. I am sure, you know, you do whatever is competitive, and I am sure, as you demonstrated in the record, you would out-hustle the next guy in terms of insuring a very good situation for your company or the interests you represent. But aren't we entitled to regard what have been the patterns and practices in the past whereby you have been able to get these concentrations of resources that have slowed down or sidetracked competition? Aren't we able to view that situation in the past in terms of what can be in the future?

Mr. HARDESTY. Well, Senator, I don't think your example of the General Motors case has an application to any of the industries we have under review here today. You have an industry there where there was a domination or at least there were only four companies engaged in the industry. One was quite a large company. That certainly is not true of the oil industry, and it is not true of the coal, and it is not true today of the uranium industry. So I don't think that can happen.

Now, one thing I want to agree with you about is that this subcommittee should continue to look at it and make sure that there is not an increasing trend of concentration and that we do not go past those levels which make all of us uneasy, where a Continental Oil Co., for instance, might have a share of each of these segments and could play one against the other. As I stated in my prepared statement, we are only producing 9 percent of the coal and 2 percent of the domestic crude oil and a little less than 2 percent of the natural gas—we can't play one fuel against the other.

And then, of course, if at any time it would be that Continental Oil should do that, I think the laws would prohibit that; and you, Senator, should continue to look at it. But we are nowhere near that situation today. There is high competition in each of these fuels.

Chairman KENNEDY. I may have to leave to vote; so I think what we will continue along and then try, in the next 10 or 15 minutes, to conclude before we go.

Mr. HARDESTY. I do have a couple of more personal comments I would like to make, and then for any questions you have time for, I would be at your disposal.

First, I have spent the greater part of my life in the coal fields of West Virginia. I have worked with large and small companies, and it is clear to me that the Nation and the coal miners are best served by a company that can bring to each challenge—and there are many of them that you face each and every year—bring to those challenges a multitude of disciplines and expertise. And the entry of the oil companies into the coal business has made it a more competitive business and it has been more responsive to public needs. And, most importantly, Senator, it is a safer and more progressive industry for the employee.

My second observation, Senator, is for the past 2 years, I have had the pleasure and opportunity of heading all our international operations. And as I have criss-crossed the globe in Europe and North Africa and the Middle East and Southeast Asia and the Far East, I have found one thing that stands out very clearly, and that is the U.S. petroleum industry is the envy of the world. It has set goals for efficiency and for success that everyone seeks to emulate. And throughout the history of this Nation, it has provided hundreds of thousands of jobs as well as an abundant supply of oil, gas, and now coal to the consumers at the lowest cost of any industrialized nation. Thus, I would only leave with this thought. Before we proceed to dismantle the industry, we need to be sure that the reasons are valid, and the resulting alternatives are viable and best serve the national purpose.

Chairman KENNEDY. I would just say this. It isn't all just sugar and spice in terms of the major oil companies and their handling of the various elements within the industry. I am sure all you would have to do is—and maybe you have—is talk to some of the independent operators up in my part of the country that have felt the squeeze by the major oil companies in a variety of different ways, and talk to the independent refiners and find out about this situation. I mean, this is not quite as glowing in terms of the competitive factors as might be described.

And this is sort of chapter and verse for many of the smaller kinds of outlets up in my part of the country. As the Federal Trade Commission report says, things are not all sugar and spice. It talks about major oil firms seeking to consolidate marketing power by various exclusionary tactics, and this is basically an attempt to limit the supply of fuel to independent refiners and to limit the refined product available to independent wholesalers and retailers. It goes on and on. And I can show you chapter and verse from letters I got from all sorts of little family owned outlets who have been squeezed out of the business by the major oil companies. This is accomplished by minimizing the use of formal market sales and thus avoiding flow of profits from within the major vertically integrated structure of the market. It is also accomplished through control of pipelines, through exchange agreements, through processing agreements, through price protection coupled with price wars, through elaborate networks of devices designed to deny independent access to the product.

So I am not trying to throw a blanket indictment at the industry, but it hasn't been quite as attractive as you might have described in terms of how majors have been willing to treat the independents or the other elements within the industry. I think this is a matter that is of considerable concern to the Congress as well. You know, we are

concerned that once they move on into these other sources of energy, whether these kinds of practices that some of these small companies have experienced would continue as well. I don't know whether you have any knowledge of that type of practice or procedure or whether it has any relation to you, but I just throw that out.

Mr. HARDESTY. May I ask a question, Senator?

Chairman KENNEDY. Sure.

Mr. HARDESTY. Do you classify Continental as a major?

Chairman KENNEDY. Well, it is 14th? Yes, I guess I would consider that a major.

Mr. HARDESTY. Well, when you say "major," what do you mean?

Chairman KENNEDY. I think obviously the traditional majors would include the top 10 and the amendment I offered would include the top 20. You are 14th?

Mr. HARDESTY. Oh. OK.

Chairman KENNEDY. But I am not necessarily including you in this description. I am just throwing that out.

Mr. HARDESTY. This is a question I was trying to get at in my prepared statement——

Chairman KENNEDY. I mean, we hear these things not just from letters from constituents but also the Federal Trade Commission report refers to it. Quite frankly, it has been echoed on instance after instance by the smaller operators up in my part of the country during the last 2 years. We had them down testifying before the Antitrust Committee and before the Interior Committee. It is a matter of very deep concern.

And quite frankly, a great deal of pressure is put on any Member of the Congress when his constituent says: "But look at what happened in this one. They are squeezing us out. If they get into the other alternative sources it is going to be the same kind of a squeeze.

Now, I don't know what your impressions from working with the industry over this period of years are——

Mr. HARDESTY. Well, I try to give my impressions in both the coal industry and now in the petroleum industry. I have 7 years in one and about 7 years in the other. There are, of course, quite a few aspects to the statement you just made.

Chairman KENNEDY. Sure.

Mr. HARDESTY. I don't translate any of it to the situation of horizontal integration, Senator. And I would only repeat the one statement I made that so long as the structure and the market performance continues as it is today—and it is highly competitive—then anyone who tries to impose on the public some of the unfairnesses you cited in regard to the marketing situation, well they just can't get away with it.

So I guess I would just say that where we are in the oil and gas industry, that is just a very small piece of that whole industry, and we wouldn't be able to get away with doing anything improper or like that.

The second thing I wanted to add is that we have gone at marketing a little differently, Senator. I think if you searched the records, you would find that we have been sensitive to some of the problems that have been raised in recent months following an obvious shortage of available supplies and the difficulties that were created. And hopefully,

we have been able to handle these problems better than some others have.

But as to your whole question, I don't know. I do think there needs to be some cleaning up. We made a series of public statements that there are certain practices that should be undertaken by the majors, including us, in our relations with the jobbers and the dealers. I think hopefully these things are underway and that we will be able to attain them and achieve them.

So you are right. It is not all sugar and honey. What I am here today to say is, it is a highly competitive industry within each segment. A couple of statements have been made here about exchange agreements and joint ventures agreements, for instance. Senator, I wouldn't be representing Continental today if it were not for joint venture agreements. It is the only way we have been able to undertake offshore exploration and production, and it is the only way we have been able to engage in high risk industries because of our limitations, because of our size. So in most of the instances, today, the smaller companies are getting into the bigger game as a result of that. So per se, they are not anticompetitive. I think the same is true with exchange agreements, and questions were raised about that. They are a way of getting to the consumer a product at a lower cost. Per se they are not bad.

Chairman KENNEDY. But the question is, they can't be viewed as competitive then if you are in a joint operation. I mean, where is the competitive factor?

Mr. HARDESTY. But you see, the inference was made in a statement about joint ventures that they go down all across the board. The joint ventures we are engaged in are basically in the high risk exploration and production areas, and they stop right there. And because we have four other companies about our size and we are offshore of Louisiana, engaged in a joint venture, but that doesn't mean it goes across the board.

We don't go past the wellhead. I mean, from that point on, we are competitively engaged in refining and marketing. So it doesn't extend down to the tender, sensitive market area.

Chairman KENNEDY. Well, it does as to the pipelines. I mean, does it as to the pipelines?

Mr. HARDESTY. Heavens, no, only in some cases in tie-ins and connections. But we are shipping products through pipelines that we have no interest in, and we are shipping products through pipelines we have an interest in. So there is a mixed bag of tricks there. There is no automatic rule you can follow, Senator.

Chairman KENNEDY. Well, I am going to have to recess to vote. If you have to go, we want you to know first how much we have appreciated your appearing here. We do have your statement for the record. It will be very helpful.

Mr. HARDESTY. I would be happy to be of any help to this subcommittee and its staff.

Chairman KENNEDY. Wonderful.

[The prepared statement of Mr. Hardesty follows:]

PREPARED STATEMENT OF C. HOWARD HARDESTY, JR.

My name is Howard Hardesty. I am a Vice Chairman of Continental Oil Company, a member of Continental's Board of Directors and a member of its Management Committee. Prior to my transfer to Continental Oil in 1968, I was Execu-

tive Vice President of Consolidation Coal Company, which I originally joined in 1963 as General Counsel.

Adequate supplies of energy in all its forms—oil, gas, nuclear, and coal, among others—are central to our national security and economic growth. The need to at least double our coal production and to increase our uranium production 600% have been identified as key elements in our national energy policy, and should not be at issue here today. The question is whether an oil company serves the national interest by assisting this vital expansion of the coal and uranium industries. Because of my association with both Continental Oil Company and Consolidation Coal Company, I am pleased to participate in these hearings.

My testimony will focus on four areas:

I. Benefits resulting from the acquisition by Continental Oil Company of Consolidation Coal Company.

II. Benefits resulting from the entry of Continental Oil Company into the uranium industry.

III. The structure and market performance of the oil, coal, and uranium industries.

IV. Requirements to meet the national goal of increased energy production.

But before getting into these issues, however, I would like to point out that any effort by Congress to bar certain types of firms from entering new business areas serves only to lessen competition and increase concentration. Any action by Congress to prevent oil companies from investing in other energy areas serves to maintain the current level of concentration in these areas and to lessen potential competition. I sincerely feel that more firms should be encouraged, not discouraged, to enter the coal business and the uranium business because only with more firms can we increase competition, lower concentration, and supply the increased amounts of coal and uranium that this country so desperately needs.

In addition, by transferring the oil industry's petrochemical and refining technology to the fields of coal gasification and liquefaction, oil companies can help increase the use of coal and create new supplies of oil and gas.

Because we are just as unhappy with the high price of imported oil as you are, we are doing everything we can to develop liquefaction and gasification processes which hopefully will allow us someday to replace some of the imported oil we are using with synthetic fuels made from coal.

Congressional action to weaken the financial strength of oil companies by forcing them to divest their interests in other fuels would inevitably increase the costs associated with both operations and the financing of expansion and thus lower the rate of investment in new fuel supplies. The result will be reduced domestic supplies, increased imports and higher prices to the consumer. There is no evidence suppose that the effort now being undertaken by the oil industry in the coal and uranium business would be replaced by a similar effort from others who would have the same combination of technological, financial and managerial skills.

I. BENEFITS RESULTING FROM CONTINENTAL OIL COMPANY'S ACQUISITION OF CONSOLIDATION COAL COMPANY

Because I am so strongly convinced that the association of Consol and Conoco has benefited the industry and the nation, I would like to specify those benefits and detail how it has promoted competition and stimulated coal production and important research.

Background of the Acquisition

Continental began to diversify its operations in the 1950's and early 1960's due to the declining outlook for growth in U.S. petroleum production. Up to that point, Continental had been primarily a domestic oil company, but rising costs of finding and developing domestic oil, declining prices of petroleum products and an artifically low price for natural gas under Federal Power Commission regulation limited opportunities in the domestic oil industry.

In view of these limitations in its traditional area of operations, Continental diversified along three main lines: first, since foreign oil was less expensive to find and produce than domestic oil, it began to develop overseas oil operations. Second, it moved into areas, such as petrochemicals, that were logical extensions of its oil business. And third, since demand for electricity was expected to grow very rapidly in coming years, Continental was attracted to the market for fuel to generate electricity. Following reviews by the Department of Justice and IRS, Conoco acquired Consolidation Coal Company in 1966.

Benefits of the Acquisition

The benefits which have come from Continental's participation in coal are numerous.

1. *Stepped-up capital spending.*—In the five years prior to its acquisition by Continental, Consol's capital outlays for new mines and expanded capacity averaged $13.5 million a year. In the years since the acquisition, the yearly average for new mines and expanded capacity was approximately $36.5 million a year.

2. *Increased employment.*—During the post-acquisition period, employment increased significantly as a result of expansion programs. In December 1966, Consol employed 11,697 people. By the end of 1974, employment had increased 40 percent to 16,351 people. Continental has been able to apply many of its training, recruiting and organization programs in making these additions to Consol's work force.

3. *Increased coal production.*—In the initial four years after acquisition, the Company's coal production increased from 51.4 million tons to 64.1 million tons (up 25 percent) as a result of the stepped-up pace of capital spending.

Throughout the industry, deep mine production decreased from 1970 to 1974. Our decline in coal output from deep mines was only 14 percent compared with an industry-wide decline of 19 percent in the 1970–74 period despite the fact that approximately 70 percent of Consol's production comes from deep mines compared to 48 percent for the industry. A number of companies moved to counter the decline in deep mine production by expanding surface mine output. Surface mine output for the industry increased 28 percent between 1970 and 1974. This increase was largely in the West. Consol participated in this expansion to some degree. But our growth in western surface mining has been limited because of the present moratorium on leasing of Federal coal lands in the West, in effect since 1971. Consol did not own large western reserves and due to this moratorium, it has not been able to block up sufficient new reserves to develop western production.

4. *Perspective on recent price increases.*—Coal prices have increased sharply since the end of price controls in April, 1974. However, these increases were required for two reasons: (a) to compensate for increases in costs which had reduced Consol's earnings to about the breake even level in the early 1970's and to a loss in 1973, and (b) to provide margins commensurate with the risk and necessary scale of investment to assure new coal production. During the past two years the coal industry and Consol have experienced sharp cost increases. Many of these increased costs arose from health, safety and environmental considerations are socially desirable, but the higher costs must be reflected in the market price for coal to justify bringing new reserves into production.

5. *Research.*—Achievements in any industry research endeavor flow only from the dedicated effort of talented and inspired men and women. It is commonly agreed that the interaction of scientists and technicians with varied disciplines and experiences brings forth new concepts and quickens technological development. This has occurred through the interaction of Continental and Consol research and engineering capabilities and facilities.

Combined Conoco and Consol expenditures on R&D in the areas of pollution-free synthetic fuels, mine health and safety, environmental safeguards, operational efficiency, and improved transportation methods demonstrate the accelerated tempo of our research. Taking the areas of liquefaction, gasification, and pollution abatement as an example: $1.2 million was spent during the four-year period from 1963 to 1966. In the eight-year period since the acquisition, such expenditures amounted to $9.4 million, a nearly fourfold annual increase. The scope and accomplishments of our efforts are illustrated by a brief summary of our principal programs.

(*a*) A feasible coal liquefaction process has been demonstrated by "Project Gasoline" at Cresap, West Virginia. This process has substantial cost advantages over earlier technology. Continental's engineers, utilizing the company's oil refining know-how, made important contributions to development of coal liquefaction in operations as well as in process design.

(*b*) The synergistic effect of oil-refining technology upon coal processing has been most dramatically demonstrated in our highly successful, large scale coal gasification work at two locations. At Rapid City, South Dakota, Consol's carbon dioxide acceptor process has successfully produced low BTU gas. This large pilot plant was designed by Continental's engineers who also supervised construction and assisted extensively during start-up. Because the work at Rapid

City as well as the coal liquefaction program was pursued in conjunction with the Office of Coal Research, the know-how and technology are automatically available to all firms.

In Westfield, Scotland, a second coal gasification program converted Lurgi process low-BTU gas to pipeline quality gas on a commercial scale. Conoco acted as program manager for the 16 participating U.S. companies. This program lasted 30 months and cost $6 million. In this case, not only did Continental's engineers design, construct, and operate the large scale methanation facility, but Continental's researchers gathered the design data from a small bench-scale unit in our Ponca City, Oklahoma, laboratories and provided technical service assistance throughout the entire program. At the conclusion of this commercial-scale test in August, 1974, 2.5 million cubic feet per day of the synthetic gas were fed into the local gas distribution grid where it was used by several thousand Scottish consumers. This project verified a large scale methanation process and represented the final step in proving technology required for manufacturing substitute pipeline quality gas from coal (a fuller review of the methanation project at Westfield is provided in Exhibit I).

The project at Westfield also confirmed that methanol—an easily transported, easily stored, clean burning fuel—can be produced in substantial quantities from coal. Consol has subsequently joined a group of 14 other United States companies to finance the development of an improved version of the Lurgi gasification system at Westfield. This work on the so-called slagging gasifier is currently in progress.

(*c*) Mine safety and productivity programs have been accelerated. Research expenditures in this area amounted to over $9 million since inception, including 1975 budgeted outlays. These expenditures, initiated about two years prior to the enactment of the 1969 Coal Mine Health and Safety Act, were in addition to previously cited research programs. The principal efforts have been directed to:

(1) A hydraulic transportation system to provide continuous transport of coal in coarse, aqueous slurry form from the mine face to the preparation plant. This system is designed to increase mine safety and productivity by eliminating the hazards and bottlenecks of transporting coal by traditional methods. Continental's pipeline technology and know-how have been fundamental to this research. We hope the first demonstration of this entire underground hydraulic transportation system will occur this month in Consol's Robinson Run mine.

(2) A program to remove methane gas from coal mines. Oil field drilling skills have been applied in the development of several new techniques: (a) the drilling of long horizontal holes in the coal seam to predrain methane before mining, (b) a system of sealing coal fracture systems with silica gel to reduce methane escape into underground shafts and (c) drilling wells from the surface into the cave "gob" zone (which results when coal is extracted underground). These wells have successfully removed about one-half of the methane gas from these cave zones, thereby lessening the danger to active mining areas. These techniques demonstrate the use of oil field know-how in coal mine applications.

(3) Continental Oil Company's geophysical and geological technology has been used in the development of a seismic mine monitoring system for detection not only of roof falls, but also for location of trapped miners. An air monitoring system has reecntly been installed in the Loveridge mine which operated in conjunction with the seismic monitoring system. The air monitoring system consists of four major stations which monitor methane, carbon monoxide, temperature, rate of change of temperature, and air velocity. The system is now operating on a full-time basis.

(4) The first successful application of underground mine design utilizing rock mechanics principles was recently completed. Two long walls in Northern West Virginia were designed by Conoco Research personnel and successfully implemented in coordination with Consol operators.

(*d*) A wide range of environmental protection programs have been undertaken. Over half of all domestic coal is classified as high sulfur. In the eastern United States, where the largest markets for coal have historically been located, only about 11 percent of recoverable reserves are classified as low sulfur, and most of these low sulfur reserves are metallurgical coal, unsuitable as fuel in electricity generation. Urban areas can use high sulfur coal for electrical generation only if stack gases are scrubbed to remove sulfur dioxide. Currently available scrubbing systems have been difficult and costly to operate and maintain. Second-

generation scrubbing systems are expected to reduce costs and improve efficiency and reliability. If these processes are perfected, over 80 billion tons of high sulfur, currently unusable coal can be made available to eastern utilities as an environmentally acceptable fuel to generate electric power.

Continental engineers have developed and designed a stack gas scrubbing unit which recovers elemental sulfur as a byproduct. It will permit the burning of high-sulfur coal without polluting the environment.

In summary, Continental's participation in coal has stimulated capital spending, employment, safety, coal production and research. In so doing, it has established no new or increased barriers to entry into those industries. On the contrary, Continental's entry into coal has stimulated competition through increased production and increased innovation.

II. BENEFITS RESULTING FROM CONTINENTAL OIL COMPANY'S ENTRY INTO THE URANIUM INDUSTRY

In evaluating the best way to participate in the expected rapid growth in demand for uranium fuel to generate electric power. Conoco management decided in the mid-1960's that exploration for and mining and milling of uranium ore provided a most attractive investment opportunity for the Company. Uranium exploration efforts could draw upon Continental's considerable petroleum exploratory expertise. Like petroleum exploration, uranium exploration draws heavily on the techniques of exploring sedimentary formation.

Consequently, a Minerals Department was established, and uranium exploration begun in 1967. Sufficient proved reserves were discovered by 1969 to justify the development of a mine and mill project in South Texas. Mill design was begun in 1970, construction commenced in 1971, and production began in 1972.

1. Capital Spending

Continental has pursued an aggressive and competitive program in its uranium activities. From 1967 to 1974, it spent approximately $52.2 million for exploration and development of reserves and the construction of the mine and mill in Texas.

Even more capital will have to be invested in future exploration and development in order to keep pace with the constantly rising demand for uranium.

2. Increased Uranium Production

Prior to Continental's entry into uranium production in 1972, there were 12 uranium producers in the United States with 14 mills. Since then Continental and two other producers have entered the market, one producer has left, thus making the present total of 14 producers with 16 mills. Continental's operation processes about 1,750 tons of ore per day and produces approximately one million pounds of U_3O_8 concentrate per year. As a new entrant into this important field, Continental, with about 4% of U.S. uranium production, has added to the diversity of firms already pursuing programs and has helped to reduce the market shares of the established companies.

III. INDUSTRY STRUCTURE AND MARKET PERFORMANCE

Critics frequently label the oil industry as monopolistic and charge that this is the reason for recent increases in oil prices. They also contend this monopolistic structure will spread to other fuel industries if oil companies begin to operate in them. Yet, all the data we have about this issue indicates just the opposite, namely the oil industry is intensely competitive.

A. Competition in the oil industry

All of the available facts confirm that the oil industry is highly competitive. In the face of overwhelming evidence, some industry critics have been forced to retreat on this issue. Now these critics have resorted to criticism of other aspects of the petroleum industry to justify their contention of anti-competitive behavior. Joint ventures among oil companies are now decried by critics as leading to a unique form of structural integration permitting exercise of monopoly power. Actually these joint ventures increase competition. The following sections consider these charges against the oil industry :

1. *Industry Structure.*—Industry structure gauges whether various forces acting on individual firms are likely to force them to behave in an independent,

competitive manner. One useful measure of industry structure is concentration ratios, indicating market shares held by the largest firms in that industry.

Students of industrial organization have always defined a concentrated industry as one where generally the top four firms control more than 50 or 60 percent of the market. Recently some statements have been made about the market share of the 20 largest oil companies. However, no reputable study has ever found a correlation between concentration among the largest 20 firms and uncompetitive behavior.

The main activities comprising the petroleum industry are exploration/production, refining and marketing. Many companies engage in each of these and in fact the Cost of Living Council lists 23 companies engaged in the petroleum industry as shown in Exhibit II with revenues in excess of $250 million.

As shown in Exhibit II-a the percentage of total activity accounted for by the four largest firms in all segments of the oil industry is lower than the average for all U.S. manufacturing industries.

On average, for U.S. manufacturing industries in 1970, the top four firms accounted for 34% of the industry's sales; the top eight firms 50%. Compare this with the situation in the principal petroleum activities.

About 10,000 companies and individual entrepreneurs are active in oil and gas production. The four largest firms accounted for 27% of petroleum liquids and 28% of natural gas production in 1974 and the top eight accounted for 43% and 42% respectively.

In refining, 130 companies operated 261 refineries in the U.S. including Puerto Rico and the Virgin Islands, with a total capacity of 14.9 million barrels/day at the beginning of 1974. The top four accounted for 30% of refining capacity and the top eight for 53%. The relative ranking of the largest companies has changed significantly over time, demonstrating competition among the firms. For example, Shell was seventh in 1951, and second in 1974, whereas Mobil dropped from second to sixth over the same years. In addition, new entrants into this segment of the industry, such as Amerada-Hess and Commonwealth have decreased the market share held by the top twenty refiners in 1951. In 1951, the top twenty companies' share of total refinery capacity was 81%. By 1974, the share of these companies had declined to 75%.

In marketing, there are over 15,000 wholesalers of petroleum products and approximately 200,000 retailers of motor gasoline, most of whom are independent businessmen, not salaried employees of integrated companies. The retail sales of the top four brands of motor gasoline accounted for 30% of the market in 1974 and the top eight for 52%. Despite allegations to the contrary, smaller marketers have increased market share in recent years. A group of companies identified as independents by the Federal Trade Commission accounted for 22% of the retail gasoline market in 1968. Recent information released by Lundberg Survey, Inc., a Los Angeles marketing data firm, indicates the group's market share increased to approximately 30% in 1974.

In sum, accepted measures of competitiveness—low to moderate concentration ratios, ease of entry and changing relative market shares—characterize all phases of the oil and gas industry.

Another frequent concern is that concentration in the oil industry may be increasing. As Exhibit III indicates, there has been a decrease from 1955 to 1974 in the share of refining and marketing conducted by the top 4 and 8 largest petroleum companies. There is reason to believe the large companies' future share of U.S. oil and gas production will decrease even further. Very expensive and risky offshore exploration/production programs initially were undertaken for the most part by the larger companies. However, more recently through the vehicle of joint ventures, smaller petroleum companies and gas pipeline companies have begun to play a larger role in the offshore areas.

The competitive structure of the petroleum industry is also evident when it is compared with the degree of concentration in selected other U.S. industries. The four largest companies in the petroleum business accounted for only 31% of total petroleum product sales. The concentration among the top four firms in other industries was 92% for motor vehicles, 48% for the steel industry, 81% for typewriters, 53% for coffee, and 70% for the rubber industry. For three of these industries, the market share for the four largest firms are more than twice as high as in petroleum activities.

The absolute size of individual oil companies is sometimes cited as having undesirable economic consequences. This charge needs to be put in perspective. The oil industry is big because of the enormous demand for oil and gas in our total energy picture. Numerous large companies, as well as many small companies, are needed to supply this demand. Individual investments may run as high as $600 million for a new refinery and up to $6 billion for projects such as the Alaskan Pipeline. Obviously, a large company is needed to undertake large investments.

2. *Joint Ventures.*—Oil industry critics have argued that joint ventures in exploration, production and pipelines together with crude oil and refined product exchanges negate the effects of low concentration ratios in the petroleum industry. This is not the case. The object of such activities is to spread risk and reduce costs. This is in the public interest because it permits smaller firms to operate in the industry and the benefits of reduced costs are passed on in lower prices to the consumer. It also guarantees that more firms remain in the industry because by spreading the risk, it lowers the possibility that a firm would count totally on any one venture, the failure of which could bankrupt the company. For example, there has been criticism of joint ventures in offshore lease bidding. But joint ventures are logical response to high capital costs and high risks. A winning bonus bid on an attractive offshore lease may cost $50 to $75 million. (Some have gone as high as $200 million.) Sums of this magnitude are too high for even the largest companies, particularly considering the possibility that the lease will not be production. Joint ventures in this situation permit more companies to participate in more ventures, which enhances competition. It is important to note that upstream activities of companies involved in joint ventures do not extend downstream into marketing activities.

B. Industry performance

While industry structure is a meaningful measure of the likelihood of competition among firms, an industry's performance in the marketplace is a direct measure of competition. This section examines the petroleum industry's record in terms of profits, prices, ease of entry and technological progress.

Profits normal.—The competitiveness of the U.S. oil industry is evident from the fact that domestic oil companies' rate of return on net worth has been close to the average of all U.S. manufacturing industries. As Exhibit IV illustrates, the average rate of return on net worth for both the petroleum industry and all U.S. manufacturing from 1965 to 1974 was approximately 13%.

This basic long term perspective has been ignored by those commenting unfavorably on the significant increases in 1973 and 1974 in petroleum company profits. The speculations on monopoly power and exorbitant profits do not stand up to the following facts:

(1) While profits increased substantially in both 1973 and 1974, the average rate of return for the petroleum industry from 1970 to 1974 was still only 13.7% compared to 12.6% for total manufacturing, not a significant difference. In fact, in five out of the last ten years, the petroleum industry's rate of return has been below the average for all manufacturing.

(2) A large part of the recent, sharp increases in earnings was due to inflation, inventory appreciation, and gains in foreign exchange transactions.

(3) Despite the recent increase in aggregate profits, oil companies' profit margins (the ratio of profits to sales) shrank from 8.1% in 1973 to 7.2% in 1974.

(4) During the first three quarters of 1975, profits for 25 oil companies surveyed by the "Oil and Gas Journal" declined 31.1% from the same period for 1974.

In short, such data confirm the competitiveness of the industry and refute accusations of monopoly control and excessive profits.

Prices relatively low.—The trend of petroleum prices demonstrates a highly competitive industry. Historically, consumers have benefited from the relatively low prices for petroleum products. Exhibit V shows that the average domestic well-head price of crude oil rose more slowly than the overall wholesale price index from 1950 to 1972. Exhibit VI shows that over the same period the retail price of both heating oil and motor gasoline (excluding tax) rose more slowly than the consumer price index, despite increases in quality and performance standards.

These exhibits also demonstrate another salient point: the dramatic increase in crude oil and refined product prices in 1973 and 1974. This increase was caused

by the Arab embargo of oil shipments to the U.S., sharply increased OPEC taxes and royalties, and higher operation costs.

Industry open to new entrants and shifting market shares.—Another measure of competition in an industry is the ease with which new companies can enter the industry and the ability of smaller companies to expand. The openness of the industry again proves the oil industry is competitive. As mentioned earlier, there are some 10,000 companies and individual entrepreneurs engaged in the exploration for and production of crude oil and natural gas; in oil refining, there are 130 companies with refining capacity; and in petroleum marketing, there are some 15,000 wholesale marketers. The makeup of the large number of companies in each activity is continually changing, with some companies leaving and others entering the industry.

This ease of entry is demonstrated by the following examples:

(1) Eight independent refiners have constructed about 700,000 barrels/day of refining capacity in the East Coast, Puerto Rico and Virgin Islands from 1951 to 1974, as shown in Exhibit VII. Only two of these companies were in the refining business in 1951—Quaker State and United, both of which have built new refineries.

(2) From 1968 through 1974, independent marketers increased their share of the U.S. market from 22% to 30%. New entrants contributed to this increase.

Another significant indication of the absence of monopoly control is the ability of individual companies that were once much smaller to expand rapidly. In the postwar period, Tenneco, Amerada-Hess and Occidental moved into the ranks of the major companies.

Technological innovation vigorous.—Rapid technological change has occurred historically in the principal petroleum activities. This is characteristic of a dynamic competitive industry seeking to reduce or retard cost increases and improve product quality. These efforts are obviously necessary for success in the marketplace. Beyond this, however, the petroleum industry faces a basic problem different from many other industries. The most easily detected and closest to market petroleum reserves are developed first; so supplies developed later tend to be higher cost. Technological inovation is necessary to hold down this basic tendency toward increasing costs of oil and gas.

Over the last twenty years, oil companies have made remarkable progress in the techniques of finding and developing new oil. For example:

(1) In developing resources ever deeper in the earth. In 1930, oil drilling had probed less than two miles under the earth's surface; now, the deepest wells go down nearly six miles in the search for oil and gas.

(2) A far larger proportion of oil is now recovered from the reservoirs. Twenty years ago, only about one-quarter of all the oil in place in fields which had been discovered was being recovered. Now, on average, the industry recovers about one-third of the oil in place in the nation's oil reservoirs. Under optimum conditions, using the best available technology for primary and secondary recovery programs, approximately 50% of the original oil in place can be recovered from a typical reservoir.

(3) Oil companies have developed the ability to operate effectively in increasingly hostile regions as they seek new petroleum supplies. Just after World War II, oil companies began drilling in the marshes and shallow water offshore in the Gulf of Mexico. Now, oil companies are drilling and producing oil under violent weather conditions in the North Sea in water depths up to 500 feet. Exploration for hydrocarbons is now underway in water over 1,000 feet deep. (Such techniques can be employed in our own Outer Continental Shelf waters, at such time as the government permits us to proceed.) Without such advances, however, present production from offshore areas—about 16% of current domestic oil output—would not have been available.

Conclusions about market performance.—A factual appraisal of petroleum companies' performance indicates conclusively that a high level of competition exists. Long-term profitability is reasonable. Product quality has increased and petroleum price advances have been moderate. Entry of new firms occurred and is occurring in all segments. No artificial barriers bar new competitors, as has often been alleged. Finally, marked technological advances have provided relatively low-cost, high-quality petroleum products.

In this situation, the consumer benefits from the lowest price possible. This is the way it should be: new entrants and existing producers have to be efficient to compete. In a competitive situation such as this, an umbrella is not held over the inefficient producer.

C. Competition in the coal industry

Competition within the coal industry is as intense as in the oil industry. In coal production, the four largest companies accounted for only about 27% of total output and the top eight companies about 37% in 1974. Of the four largest coal producers, two were owned by companies engaged in the petroleum business (Continental and Occidental). Some people interpret this ownership as evidence of control over energy markets. In doing so, they overlook these facts. Although these two oil companies own the second and third largest coal producers, neither oil company is among the top eight crude oil producers and one (Occidental) holds only a minor position in the U.S. petroleum business. All the petroleum companies operating in coal accounted for only about 18% of total coal production in 1974. The matter of ownership by oil companies neither adds nor detracts from the fundamental fact that there is a low level of concentration in the coal industry. The truly important consideration is that the largest coal companies conduct a relatively modest part of that industry's total activity.

Petroleum companies own only a slighly larger share of total recoverable U.S. coal reserves than their modest portion of coal industry production. Based on a conservative estimate of recoverable coal reserves, the top four coal companies held about 28% of the total recoverable leased reserves in 1973, and the top eight held about 42%. Of the top four coal reserve owners, Continental Oil Company was the largest with 7.9% of the industry total; the other three were non-oil companies. Petroleum companies accounted for only 24% of total recoverable coal reserves in 1973. (Exhibits VIII and IX.)

But consider as well that some 40% of coal resources are estimated to be under government lands. Based on estimates of economically recoverable reserves of 150 billion tons, this would amount to 60 billion tons held by the government. This is almost twice as much reserves as the oil companies now hold. When reserves are opened up for leasing, there will be ample opportunity for new entrants into the coal industry.

Recent trends in coal industry concentration can be better understood in the light of historical perspective. Some increase in concentration of coal production occurred in the 1940–1965 period, as large coal companies acquired small coal producers. This trend sprang from the need to develop a more efficient organization of production. Small scale coal operations were becoming increasingly uneconomical because of (1) the very large mines required for electric utility generating stations, (2) the introduction of unit trains, which required a large single supply point, (3) the development of high voltage transmission lines serving mine-mouth generating plants, (4) the high costs of modern cleaning plants needed for coal supplied to public utilities, and (5) the need for increased mechanization to reduce coal mining costs.

Since the mid 1960's, new entrants into the coal industry have slowed the acquisition of small coal companies by large coal companies. Since that time, the acquisition of large coal reserves by new entrant oil and non-oil companies has introduced significant new competitive forces into the coal industry, rather than decreasing competition as is sometimes alleged. In fact, before Consolidation Coal was acquired by Continental in 1966, it had grown almost exclusively by the acquisition of other coal companies. Since 1966, however, Consol has grown only through internal expansion.

D. Competition in the uranium industry

The four largest companies in the uranium industry accounted for 56% of estimated mill capacity of yellowcake concentrate (U_3O_8) in 1973, a somewhat greater degree of concentration than in most other fuel activities. The largest uranium producer, Kerr-McGee, is also in the petroleum business but produces less than one-half of one percent of total domestic crude oil output.

Oil companies had about 43% of estimated milling capacity in 1973. Excluding Kerr-McGee, petroleum firms accounted for only about 12% of 1973 milling capacity.

Concentration in uranium milling has declined in the last few years. This trend toward lesser concentration is expected to continue as new explorers initiate production to capture some part of the expected rapid growth in uranium demand. In 1974, the Energy Research and Development Administration reported that 62 companies conducted uranium exploration activities.

A significant number of these uranium explorers were petroleum companies. Rather than reducing competition, their diversification into this field brought

capital, special competence in terms of geological expertise, knowledge and experience in directing high-risk, capital-intensive ventures and energy marketing skills. These factors have permitted oil companies to maintain steady exploration programs and to expand production at a more rapid pace than other firms in the industry.

In terms of uranium reserves, the most recent data (made available by Atomic Energy Commission in testimony by its former Chairman, Dr. Dixy Lee Ray, before the Senate Committee on Interior and Insular Affairs in December 1973) indicate that the top four companies accounted for approximately 56% of total reserves in 1972. Petroleum companies accounted for about 50% of total uranium reserves. Again, Kerr-McGee's share of total reserves is responsible for a large part of the oil companies' share.

The amount of ultimate, economically available uranium resources of the U.S. is not known. Because of easier location and access (depth and concentration), a high proportion (80–90%) of uranium exploratory drilling has been carried out in only 10% of the area in which uranium occurrences have been found. Additional reserves can be developed, however their location and exploitation will require the technology and resources available to the petroleum industry.

E. Competition in the energy business

One issue of particular interest to this committee is the degree of competition between oil, coal and uranium, and possible consequences of common ownership of these resources by oil companies. My feeling is that there are many benefits which derive from this association while at the same time competition is adequately preserved: first, because interchangeability among fuels is limited, horizontal integration may actually create competition by speeding development of coal liquefaction and gasification; secondly, because ownership of total energy sources is so diffused as to preclude anti-competitive behavior.

1. *Competition Among Fuels.*—The energy concept, I believe is a useful frame of reference and is sufficiently comprehensive to indicate the complex relationships which must be considered in setting public policy. In a very broad sense, energy sources have some common characteristics such as the ability to produce heat. But once we begin to consider how energy sources are actually used in marketplace, the difficulty of substituting one energy source for another becomes immediately apparent. The concept of interfuel competition, while practical at the design stage, looses relevance in the real energy marketplace because of the tremendous costs involved in modifying existing equipment to use another, different energy source. Existing equipment uses either coal, oil or uranium and thus a particular energy user is a factor in only one market: he buys coal, oil or uranium, and his ability to use another energy source is limited by the type of equipment he has, not by the energy market itself. By looking at the various markets served by the different energy sources of oil, coal and uranium, as well as their normal methods of sale, I believe we can gain a better understanding of why interfuel competition is a misnomer and also how real competition can be increased by encouraging horizonal integration.

2. *Transportation.*—Interfuel competition in the vast market for transportation fuels is today virtually nonexistent. Nuclear power for individual vehicles seems quite unlikely, and with the demise of the steam locomotive, the transportation market for coal has practically disappeared. The characteristics of petroleum fuels, with their high energy content per unit weight and volume, make them ideal for the transportation market. Until suitable coal liquefaction processes can be developed, natural petroleum products can be expected to continue to dominate the transportation market, which currently accounts for about 56% of all refined petroleum products. Common energy resource ownership, and with it the transfer of technology essential to improve coal liquefaction processes, can therefore be expected to create new competition which will benefit the consumer by increasing petroleum supplies and lowering our nation's requirements for expensive imported oil.

3. *Home Heating.*—A similar lack of interfuel competition is also found in the home heating market. Artificially low prices for natural gas, caused by government regulation, and the cleanliness and convenience of petroleum products have gradually displaced coal from the home heating market. Whereas 84 million tons of coal were used to heat homes in 1950. the figure has dropped to only 9 million tons of coal in 1974, a 90% decline. Because of the enormous

conversion costs associated with a return to coal for home heating, especially in houses with natural gas or electrical heating systems, it is unlikely that many homeowners would convert to coal as long as supplies of natural gas and petroleum products are available. Therefore, unless coal gasification and liquefaction processes can be developed, through the synergism of petroleum and coal technologies, little real interfuel competition can be expected in the home heating market. Uranium is not and probably will not be a factor in the home heating market.

4. *Coke.*—Although both coal and petroleum can be converted to coke, they produce two different types of coke for entirely different markets. Petroleum coke, which makes up less than 2% of the refined petroleum products market, is generally converted into high purity electrodes. Metallurgical coke produced from coal, which accounts for about 16% of U.S. coal consumption, is used only in the production of ferro-metals. The two coke markets are therefore quite separate and do not compete.

5. *Petrochemicals.*—Coal currently plays a very minor role in petrochemical production. But if the oil firms can continue to be encouraged to transfer their technology in petrochemicals and refining to help speed development of coal liquefaction and gasification, it would be possible to generate added competition in the petrochemical feedstock market.

6. *Industrial Boiler Fuel.*—The single largest factor responsible for the decline of coal as an industrial boiler fuel has probably been the high cost of the air emission control devices necessary to meet government environmental regulations. This high cost has driven many industrial firms, especially the smaller firms, away from coal and forced them to switch to oil. Whereas around 25% of the coal consumed in the U.S. in the mid-60's was used by industry, by 1974 this percentage had dropped to less than 12%. And until processes can be developed which will enable coal to meet environmental standards, interfuel competition in the industrial broiler fuel market can be expected to decline even further. By helping to develop those processes, oil company entry into the coal business will reverse this trend and increase our nation's ability to use coal and produce new supplies of synthetic oil.

7. *Utility Fuel.*—The only significant market currently served by all three energy sources of coal, petroleum and uranium is the electric utility market. Interfuel competition in this market is best understood within the context of power plant construction and economics. Once a utility decides to construct a nuclear reactor, that particular power plant can only be fueled with uranium, and it is not in the market for either gas or oil. A similar situation applies to power plants designed to use oil or coal. Once the plant is built, the modifications necessary to convert from oil to coal are enormously expensive. For a plant designed to burn oil, for example, the modifications necessary for conversion to coal are not limited to just boiler changes. Railroad lines, a rail car storage yard, coal storage, conveyers, feed systems, ash removal and storage systems are needed, and a stack gas scrubber may have to be installed. Aside from cost considerations, the physical space required by these new systems may not be available, rendering conversion impossible.

The end result is that once utility power plants are constructed, they are largely wedded to a particular energy source and interfuel competition is practically nonexistent. For this situation to change dramatically, some process for coal liquefaction or gasification must be developed, and here again the contribution of oil company research and development is vitally important. Horizontal diversification encourages the transfer of technology necessary to develop commercial liquefaction and gasification plants, thereby creating new markets for coal and freeing up petroleum products for other uses. Horizontal diversification can increase competition in this way and every increase in competition must be encouraged.

Before talking about overall concentration in the energy industry, I would like to say a few words about coal and oil prices.

Exhibit X shows the delivered costs of oil and coal consumed by most electric utilities. It is immediately apparent that the price of the two fuels are greatly different. According to the April 1975 FPC report on fuel costs, the delivered cost of oil to electric utilities was $12.79 per barrel (208.8¢ per million BTU). On an oil equivalent basis, utilities paid $4.93 per barrel for coal (80.5¢ per million BTU).

Both coal and oil prices have trended upward from 1969 to 1974 but the size of their increases have been markedly different and the reasons for price rises for coal and oil have been quite different.

An explanation for the slight correlation between coal and oil prices is the current structure of the coal market. According to a Mitre Corporation Study for the FEA ("An Analysis of Steam Coal Sales and Purchases"), 75% of steam coal is sold under long term contract. The price of coal sold under long term contract is generally unrelated to the price of fuels in other energy markets. Contract price increases are subject to the careful scrutiny of customers. The buying power of large users (mainly utilities) tends to preclude unjustified price increases by coal producers that are not a reflection of real cost increases.

Rather than responding to higher prices of other fuels, coal price increases in recent years have been caused by rapidly escalating production costs. Factors contributing to higher costs were: (a) productivity declines caused by the Federal Coal Mine Health and Safety Act of 1969; (b) increased labor costs; (c) inflation in capital equipment costs; and (d) higher material and supply costs. Historically, return on investment in the coal industry has been very low. If coal production is to be sufficient to meet future demands, profit margins must be high enough to justify new mines. Only in the past year or two have coal prices begun to approach this level.

8. *Concentration in Fuels Industries.*—A further consideration in treating all energy fuels as a single industry is that market shares are so small in this wider market as to make any charges of anticompetitive behavior meaningless. The situation is comparable to citing an automobile manufacturer's share of the transportation business or a steel firm's share of the metals business. Exhibit XI shows concentration ratios for total energy production in the U.S. in 1974. The largest firm controls only 6.8% of the market, while the largest four firms shares only 19%.

Because of the end-use restrictions mentioned above, the number of customers who can choose between oil and coal is very small. Consequently, the market price for coal and oil is set by competition in two largely different markets. The price level determined by these markets would indicate to the few customers who had the choice which fuel to buy. Continental will compete in each market and Consolidation Coal Company is free to sell coal to utility companies that might have been previously buying oil. With 2% of the petroleum market, 9% of the coal market, 4% of the uranium market and less than 2% of the market for natural gas, Continental is not in a position to have any significant influence on the prevailing price levels of these fuels.

IV. REQUIREMENTS TO MEET THE NATIONAL GOAL OF INCREASED ENERGY PRODUCTION

The primary objective of any national energy policy must be to provide adequate and secure energy supplies to American consumers at reasonable prices. This objective is not a partisan matter: the Administration, Congress and the public agree that we must reduce our vulnerability to foreign pressure and accelerate development of domestic energy supplies. Events of the past two years have shown that as long as the U.S. is highly dependent on foreign energy sources, it is vulnerable to supply interruptions—with adverse effects on its economy and employment—and to further arbitrary energy price increases.

To reduce over-reliance on energy imports requires a strong increase in our domestic production of energy.

A. Capital requirements for

1. *Increased production of domestic energy supplies.*—In a forecast for the Federal Energy Administration Arthur D. Little, Inc. estimates more than $1 trillion (1974 dollar value) will be needed between 1974 and 1990 for domestic energy investments (Exhibit XII). If even a moderate 5% inflation rate is assumed, investment could increase to $1.4 trillion by the time the outlays are actually made.

2. *Increased production of coal.*—Over this period, the coal industry may have to more than double its output; this means opening 400–500 new coal mines (Exhibit XIII). The total investment needed to develop these new mines would probably be over $27 billion in 1974 dollars. This does not include any outlays for transportation facilities or the conversion of coal to gas or liquids.

Even with improved profitability within the last year internally generated funds will be insufficient to meet coal companies' capital requirements for the future if the industry seeks to double its production by 1985. There is the already high and rising cost of both new and replacement equipment required to meet health and safety, reclamation and other environmental regulations, for example. And the cost of research and development in new, more productive mining technology and alternative fuel forms from coal will continue to increase.

3. *Increased production of uranium.*—During this same period, the U.S. uranium industry will have to expand its output by over 600% to keep pace with rising demand (Exhibit XIV). According to the ADL forecast, this expansion will require the investment of an additional 19–30 billion dollars. Given the fact that existing uranium ventures have not been especially profitable, the question necessarily arises as to where this additional investment capital is going to come from.

B. Sources of investment capital

Electric utilities, which theoretically would be possible entrants, have a well-known scarcity of investment funds. In short, there is no waiting in line of possible entrants into the energy business.

Optimum development of coal logically would include those firms which have the skilled people with sufficient knowledge and expertise to be willing to commit the firms capital to large scale energy development. Petroleum companies have characteristically undertaken major investment programs. In 1974 they spent $17.4 billion, on investment in plant and equipment. Continental Oil—only the eighth largest petroleum company based on sales—invested over $490 million in the United States. Worldwide outlays for all its activities were $750 million.

CONCLUSIONS

It is in the national interest to increase the output of coal and uranium as soon as possible at the lowest price. The need for accelerated development of these resources is so great that the real answer to the question of "who should develop coal and uranium" is "everybody". Within the restraints of existing anti-trust laws and regulations, coal and uranium production should be open to everybody. Oil companies can constitute a stimulating and productive new element in the industry for three reasons:

1. Oil companies have proven skills in managing large capital projects. Their financial strength can be a great asset in generating the large amounts of capital needed.

2. The petroleum industries can supply its technology and skilled manpower in research to further fuel conversion methods, e.g., coal into gas and synthetic oil. This will increase competition by creating new markets for coal and increase supplies of oil and gas.

3. Oil company participation in the coal and uranium industries tends to increase, rather than decrease competition by increasing the number of suppliers and decreasing the market share of existing producers.

To sum up, my personal experience indicates the great advantages of petroleum companies taking part in the urgently needed development of this nation's energy industries in order to make the most of the vast potential of all of our nation's energy resources.

Exhibits.

EXHIBIT I

WESTFIELD PROJECT—COAL-GAS COMES OF AGE

AMERICAN COAL GASIFICATION COMES OF AGE

Several thousand Scottish families living in the rolling hills country beside the North Sea became the world's first consumers of substitute natural gas (SNG) made from coal when, in August, 1974, a valve was turned in a plant at Westfield, Fife, Scotland. With that action, 2.5 million cubic feet per day of gas began flowing into the gas distribution grid for the surrounding area, including the towns of St. Andrews and Dundee. This event climaxed a 30-month effort funded totally by a group of American energy companies working in close cooperation with the British Gas Corporation.

The Westfield Project, completed at a $6 million cost to the 16 participants, successfully demonstrated that high-Btu pipeline gas, suitable for United States distribution systems, can be manufactured from America's vast coal resources. This project verified a large-scale methanation process and represented the last link in proving technology required for manufacturing substitute pipeline-quality gas from coal.

Since conversion of coal to clean burning natural gas is among the principal alternatives proposed for Project Independence, the Westfield technological demonstration is a significant advancement toward the resolution of the nation's energy problems. The success of the international cooperative effort has led to

further advanced coal gasification testing and process refinement at the Scottish facility as the U.S. and other nations undertake to develop their non-conventional energy alternates.

THE METHANATION PROCESS

Producing a high-Btu pipeline-quality gas from coal involves a change in the chemical composition of the low-Btu gas produced by the gasification of coal with steam and oxygen. The composition of the low-Btu gas is changed such that the methane content is increased from about 10% to 95%. This increases the heating value of the manufactured gas from about 370 to 980 Btu per cubic foot.

In the methanation process, the methane content of the gas is increased by reacting carbon monoxide and carbon dioxide with hydrogen over a catalyst to form methane. The methane increase is accompanied by a corresponding decrease in the carbon monoxide, carbon dioxide and hydrogen content. To accomplish this at Westfield, raw gas from one of the existing gasifiers was purified and passed through a catalytic reactor.

During the production of gas from coal, sulfur compounds, gums and resins are removed through processes which allow full compliance with emission standards. Waste water effluent is cleansed and recycled in the manufacturing process.

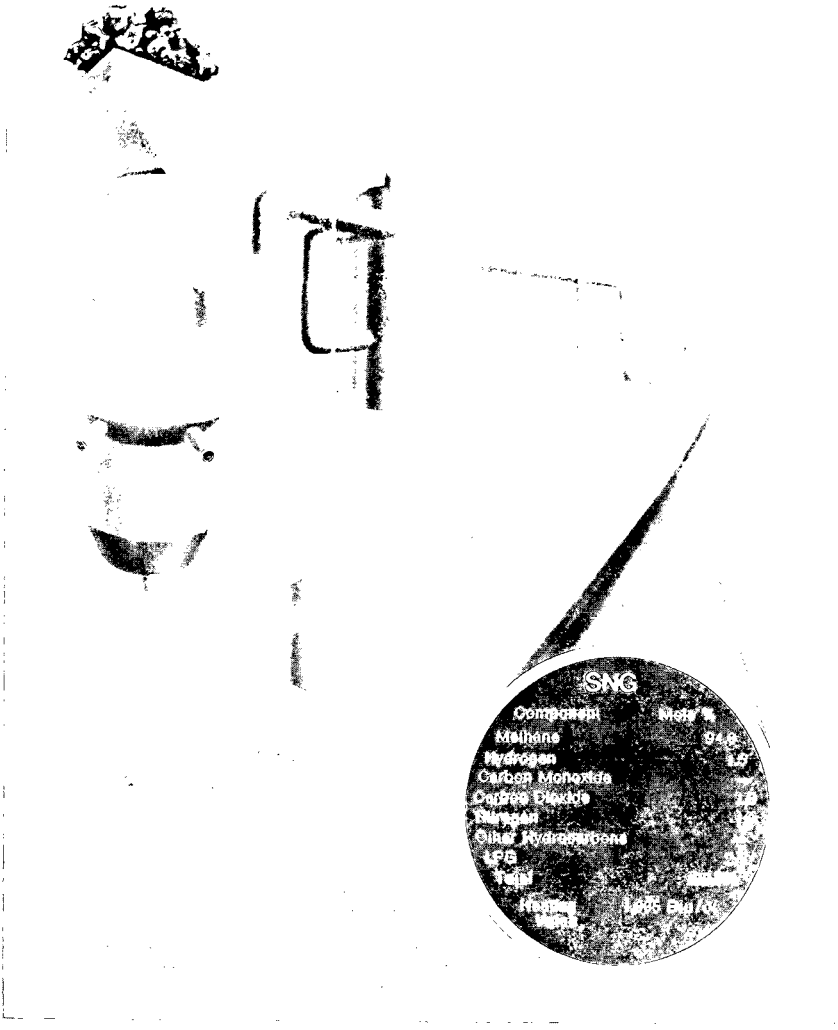
METHANATION PROJECT PARTICIPANTS

American companies participating in the Westfield Methanation Project were:

AMAX Coal Company
Cities Service Gas Company
Colorado Interstate Gas Company
Columbia Gas Transmission Corporation
Continental Oil Company
El Paso Natural Gas Company
Exxon Corporation
Gulf Oil Corporation
Natural Gas Pipeline Company of America
Northern Natural Gas Company
Pacific Coal Gasification Company
Panhandle Eastern Pipe Line Company
Peabody Coal Company
Rocky Mountain Energy Company
Transcontinental Gas Pipe Line Corporation
Transwestern Coal Gasification Company

Continental Oil Company managed the $6 million project in conjunction with the British Gas Corporation and its Scottish Region, which made the Westfield site available and assisted in design of the facilities. The plant was constructed by Woodall-Duckham Limited of England.

Originators of the Westfield Project conducted the program to demonstrate the technology which is necessary for commercial SNG projects. Participants have the rights to the process; others may receive technological data through licensing agreements. Companies involved in major U.S. coal gasification projects are using the information to confirm design of methanation units.



METHANATION PROJECT OBJECTIVE

. . . to produce from coal a gas that would be interchangeable with natural gas commonly used in the United States.

The objective of the Methanation Project, conducted at the British Gas Corporation's Westfield Plant near Edinburgh, was to establish, on a commercial scale, the feasibility of changing the chemical composition and consequently upgrading the heat content (Btu value) of gas manufactured from coal to roughly the equivalent of natural gas produced from wells. For decades, low-Btu coal gas has been manufactured and sold to industrial and residential consumers in a number of countries around the world. However, this manufactured "town gas"

has a different chemical makeup and a lower Btu value than natural gas that is supplied through United States distribution systems. Prior to the Westfield Methanation Project, there was no proven commercial-scale process for producing a high-Btu substitute natural gas from coal.

The Westfield Project involved adapting a plant which was utilizing the Lurgi process for manufacturing low-Btu gas from coal. A methanation step was added to chemically change the "town gas" to methane (the essential constituent of natural gas).

METHANATION PROJECT BACKGROUND

. . . the need to insure that U.S. coal gasification projects were technically reliable and could be evaluated in terms of economic feasibility without concern for technical risks.

When it became increasingly apparent that natural gas demand in the U.S. was growing at such a rate that there would probably never be enough domestic supplies available to answer all the needs for this clean-burning fuel, Continental Oil—among others—increased efforts to develop a dependable substitute. Because of the nation's enormous indigenous coal reserves, coal gasification represents an alternate to supplement diminishing gas supplies through conversion of secure domestic resources into a substitute for natural gas. At the current rate of consumption, America's coal reserves equal a 300-year supply—far exceeding oil and natural gas reserves.

Coal gasification technology is not new. The Lurgi process has been used to manufacture low-Btu "town gas" in Europe since the 1930s. Although "town gas" had been successfully upgraded to a high-Btu gas suitable for use in U.S. distribution systems, it had only been accomplished on a laboratory scale. It had never been attempted on a commercial scale. The Westfield Project was undertaken to demonstrate the methanation step for energy industry management, the financial community and government agencies. A successful demonstration was required to insure that coal gasification projects under consideration in the U.S. could be evaluated without concern for technical risk. Equally important, data was needed as a basis for considering coal gasification technology against that for other alternate energy sources.

In 1971, Continental Oil conducted a worldwide survey of existing coal gasification plants in an attempt to find a facility which could be adapted for testing the proposed methanation process. The Westfield site was chosen because it was the only facility in the world at which a total project demonstration could be conducted. It had all of the processing steps necessary for the experiment except for final purification and methanation. It also was designed to operate on coal similar to that found in many western U.S. regions.

The Westfield Works was producing 40 million cubic feet per day of "town gas" for distribution to area communities. North Sea natural gas was about to replace "town gas" in Scotland and the plant faced obsolescence. The British Gas Corporation agreed to keep the plant open for the proposed demonstration test. In addition, British Gas also contributed 35 years of its researchers' valuable technological background.

During 1972, Continental designed the methanation process at its Ponca City, Okla., research and engineering center. Fifteen other U.S. companies agreed to join the project and share in its development. Construction of purification and methanation units began in fall, 1972. The units were integrated into the plant operation in August, 1973.

Following a year-long program of process testing, SNG from coal was supplied to the area distribution system instead of natural gas which had only recently became available from offshore wells. After a two-month period of consumer use of Westfield SNG, the demonstration test was concluded in October, 1974, and the gas system reverted to full North Sea natural gas supply.

SLAGGING GASIFIER

In early 1974, the British Gas Corporation approached American and Canadian companies and received sufficient sponsorship to fund a three-year program to develop a fixed-bed, high-pressure slagging gasifier.

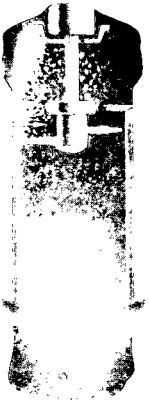
Conventional Lurgi coal gasifiers operate at temperatures that remove coal ash residue as a solid substance. The slagging demonstration will convert a Westfield Lurgi gasifier to operate at much higher temperatures so that the ash is removed as a molten slag. The higher operating temperatures of the new gasifier should result in: significantly increased gas production—four to seven times that of conventional units; a lowering of steam consumption; a higher thermal efficiency; and extension of the range of coal types suitable for gasification.

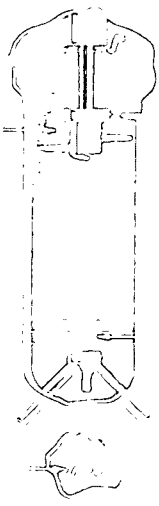
SLAGGING GASIFIER PROJECT SPONSORS

American and Canadian sponsors of the British Gas Corporation Slagging Gasifier Development Program are:

Cities Service Gas Company
Continental Oil Company
El Paso Natural Gas Company
Gulf Energy & Minerals Company
Michigan Wisconsin Pipe Line Company
Natural Gas Pipeline Company of America
Northern Natural Gas Company
Panhandle Eastern Pipe Line Company
Southern Natural Gas Company
Standard Oil Company (Indiana)
Sun Oil Company
Tennessee Gas Pipeline Company
Texas Eastern Transmission Corporation
TransCanada PipeLines Limited
Transcontinental Gas Pipe Line Corporation

Continental Oil coordinated the agreed participation of 15 U.S. and Canadian companies in the $10 million project, which is managed by the British Gas Corporation. Lurgi Mineraloltechnik GmbH, which designed the original gasifiers at Westfield, is also actively involved in the program. Sponsors of the program will receive license fee reductions as well as all data on the development of the slagging gasifier for assessment of its potential advantages over other gasifiers.





SUMMARY

The results of the Westfield Methanation Demonstration remove any doubts regarding the practical aspects of manufacturing pipeline-quality gas from coal. All processes have been clearly proven on a commercial scale and thus the technology for converting large quantities of American coal to gas is in hand. Technology embodied in the Lurgi gasifier, coupled with the proven purification and methanation processes, are in fact proposed for several coal gasification plants now under design in the U.S.

Proposed coal gasification plants in the U.S. require favorable approvals by various regulatory bodies before financing can be arranged and construction of the facilities can begin. Further delays in assessing and approving gasification technology as technically sound will seriously hinder exploitation of a badly needed alternate fuel source for this country.

The Westfield Project has implications over and above those embodied in the successful demonstration of methanation technology. The methanation effort at Westfield was accomplishel by U.S. energy companies working through an international cooperative effort to help solve one part of the world's energy problem. Perhaps as significant as the project's success are the facts that the program was completed on schedule and within budget. These achievements—indicative of what can be accomplished by industry to help solve energy-related problems—should be among the factors considered in the decision-making process required to meet Project Independence goals.

The success of the cooperative effort in demonstrating methanation was a major advancement toward realization of commercial production of gas from coal, and, as a result, continuing gasification development is being conducted at the Westfield Plant. Following completion of the Methanation Demonstration, the plant was shut down as a commercial manufacturing facility and converted to a full-scale center for undertaking various aspects of coal gasification research, development and technical services. The facilities currently are being utilized by American, Canadian and British researchers for development and evaluation of advanced gasification technology.

Through an international effort by private industry, with the cooperation of the British Gas Corporation, reliable, commercial-scale coal gasification is now a reality.

EXHIBIT II

Major Companies as Defined by the Cost of Living Council:

Amerada Hess	Pennzoil
Ashland	Phillips
Atlantic Richfield	Shell
Cities Service	Skelly
Continental	Standard of California
Exxon	Standard of Indiana
Getty	Standard of Ohio
Gulf	Sun
Kerr-McGee	Texaco
Murphy	Tenneco
Marathon	Union of California
Mobil	

The 23 oil companies that were subject to special Cost of Living Council price controls, which applied to companies with annual revenues from crude and refined products of $250 million or more.

EXHIBIT II–a

[Amounts in percent]

	1974 concentration ratios (percent)		
	Top 1	Top 4	Top 8
Production:			
Oil (net liquid hydrocarbons)	8.5	27	43
Gas (net)	10.3	28	42
Refining capacity	8.4	30	53
Marketing:			
Retail gasoline sales	8.1	30	52
All petroleum products	10.7	31	52
All U.S. manufacturing median (1970)		34	50

Source: Annual Reports and Department of Commerce Annual Survey of Manufactures, 1970.

EXHIBIT III

CHANGES IN CONCENTRATION RATIOS

	1955		1974	
	Top 4	Top 8	Top 4	Top 8
Oil production	19	31	27	43
Gas production	[1] 23	[1] 35	28	42
Refining	33	58	30	53
Marketing—gasoline sales	31	55	30	52

[1] Sales to Interstate Pipelines.

EXHIBIT IV

PERCENTAGE RATE OF RETURN ON NET WORTH, STOCKHOLDERS' EQUITY

Year	All manufacturing [1]	Petroleum industry [1]	Continental Oil Co. average net worth
1965	13.9	11.9	10.0
1966	14.2	12.6	10.8
1967	12.6	12.8	11.0
1968	13.3	13.1	10.9
1969	12.5	12.1	10.1
1970	10.1	10.9	10.8
1971	10.8	11.2	9.2
1972	12.1	10.8	10.7
1973	14.8	15.6	14.1
1974	15.4	19.9	17.0
1965–74 (average)	13.0	13.1	11.5
1970–74 (average)	12.6	13.7	12.4

[1] Data from First National City Bank (net worth beginning of year).

EXHIBIT V

U.S. CRUDE OIL PRICE DATA

	Average domestic wellhead crude prices (dollars per barrel) [1]	Wholesale price index, all commodities 1967=100.0
1950	$2.51	81.8
1951	2.53	91.1
1952	2.53	88.6
1953	2.68	87.4
1954	2.78	87.6
1955	2.77	87.8
1956	2.79	90.7
1957	3.09	93.3
1958	3.01	94.6
1959	2.90	94.8
1960	2.88	94.9
1961	2.89	94.5
1962	2.90	94.8
1963	2.89	94.5
1964	2.88	94.7
1965	2.86	96.6
1966	2.88	99.8
1967	2.92	100.0
1968	2.94	102.5
1969	3.09	106.5
1970	3.18	110.4
1971	3.39	113.9
1972	3.39	119.1
1973	3.89	134.7
1974	[2] 6.85	160.1
Average annual rate:		
1950–72 (percent per year)	1.38	1.72
1950–73 (percent per year)	1.92	2.19
1950–74 (percent per year)	4.27	2.84
Total percentage change:		
1950–72	35.1	45.6
1950–73	55.0	64.7
1950–74	172.9	95.7

[1] Source: U.S. Bureau of Mines.
[2] Preliminary.

EXHIBIT VI

U.S. HEATING OIL AND REGULAR GRADE GASOLINE PRICE DATA

	Average retail price, No. 2 fuel oil (cents per gallon)[1]	Average retail price, regular-grade gasoline service station (ex tax) (cents per gallon)[2]	Consumer Price Index, all item 1967=100.0s
1950	12.28	20.08	72.1
1951	12.97	20.31	77.8
1952	13.29	20.04	79.5
1953	13.98	21.28	80.1
1954	14.07	21.56	80.5
1955	14.54	21.42	80.2
1956	15.25	21.57	81.4
1957	16.03	22.11	84.3
1958	15.12	21.47	86.6
1959	15.32	21.18	87.3
1960	15.05	20.99	88.7
1961	16.00	20.53	89.6
1962	15.66	20.36	90.6
1963	15.68	20.11	91.7
1964	15.64	19.98	92.9
1965	15.96	20.70	94.5
1966	16.39	21.57	97.2
1967	16.91	22.55	100.0
1968	17.45	22.93	104.2
1969	17.82	23.85	109.8
1970	18.48	24.55	116.3
1971	19.63	25.20	121.3
1972	19.72	24.46	125.3
1973	22.74	26.88	133.1
1974	36.02	40.41	147.7
Average annual rate:			
1950–72 (percent per year)	2.2	0.9	2.5
1950–73 (percent per year)	2.7	1.3	2.7
1950–74 (percent per year)	4.6	3.0	3.0
Total percentage change:			
1950–72	60.6	21.8	73.8
1950–73	85.2	33.9	84.6
1950–74	193.3	10.2	104.9

[1] Multiplied the Consumer Price Index for No. 2 fuel oil for eacy year with 1967=100.0 by the average price of No. 2 fuel oil for 1967 (16.91 cent·/gallon)—Department of Labor, U.S. Bureau of Labor Statistics.
[2] Source: Platt's "Oil Price Handbook and Oilmanac," 51st Edition.

EXHIBIT VII

NEW REFINERIES BUILT BY INDEPENDENTS, EAST COAST, PUERTO RICO, AND VIRGIN ISLANDS 1951–74

Company		b/d capacity
Amerada-Hess [1]	St. Croix, V.I	440,000
Commonwealth [1]	Penuelas, P.R	110,000
Amerada-Hess [1]	Port Reading, N.J	70,000
United Refining Co	Warren, Pa	38,100
Pace Oil [1]	Wilmington, N.C	12,000
Quaker State	Newell, W. Va	9,700
Seminole Asphalt [1]	St. Marks, Fla	5,000
National Oil Recovery [1]	Bayonne, N.J	3,000
Young Oil Co.[1]	Douglasville, Ga	2,500
Total		690,300

[1] These 6 companies were not in the refining business in 1951.

Source: National Petroleum Refiners Association.

EXHIBIT VIII

DERIVATION OF TOTAL RECOVERABLE U.S. COAL RESERVES [1]

A. *Underground Coal Reserves (Minable by Underground Mining Methods).—Billions of Tons.*

Remaining Measured and Indicated Reserves,[2] 349.1.

Economically Available Reserves,[3] 209.2.

Recoverable Reserves,[4] 104.6.

B. *Surface Coal Reserves (Minable by Surface Mining Methods.*—Recoverable Reserves in Billions of Tons, 45.0.

C. *Total Recoverable U.S. Coal Reserves (Billions of Tons.)*

Total Recoverable Underground Coal Reserves	104.6
Total Recoverable Surface Coal Reserves	45.0
Total Recoverable U.S. Coal Reserves	149.6

[1] Source: National Petroleum Council, "U.S. Energy Outlook" (December 1972). Based on USGS Bulletin 1275.

[2] Bituminous, subbituminous, and lignite in seams of "intermediate" or greater thickness with overburden of less than 1,000 feet.

[3] Excludes lignite and "intermediate" thickness seams of bituminous and subbituminous coal.

[4] Based on 50-percent recovery of economically available reserves.

EXHIBIT IX

OWNERSHIP OF COAL RESERVES (1973)

Company	Reserves [1] (millions of tons)	Percent of recoverable reserves
Continental Oil Co	11,811	7.9
Burlington Northern	11,400	7.6
Union Pacific	10,000	6.7
Kennecott	8,900	5.9
Exxon	7,000	4.7
North American Coal Corp	5,000	3.3
American Metal Climax	4,900	3.3
Occidental Petroleum	3,500	2.3
U.S. Steel	3,000	2.0
Mobil Oil	3,000	2.0
Gulf Oil	2,600	1.7
Eastern Gas & Fuel Associates	2,600	1.7
Pacific Power & Light	2,500	1.7
Atlantic Richfield	2,200	1.5
Sun Oil	2,200	1.5
Texaco, Inc	2,000	1.3
Bethlehem Steel	1,800	1.2
American Electric Power Corp	1,500	1.0
Pittston Co	1,500	1.0
Kerr-McGee	1,500	1.0
Total	88,911	59.3
Other known privately held coal reserves	13,829	
Total known privately held coal reserves	102,740	
Total recoverable coal reserves [2]	150,000	

PETROLEUM COMPANY OWNERSHIP OF COAL RESERVES (1973)

Continental Oil Co	11,811	7.9
Exxon	7,000	4.7
Occidental Petroleum	3,500	2.3
Mobil Oil	3,000	2.0
Gulf Oil	2,600	1.7
Atlantic Richfield	2,200	1.5
Sun Oil	2,200	1.5
Texaco, Inc	2,000	1.3
Kerr-McGee	1,500	1.0
Total	35,811	23.9

[1] Sources: 1974 "Keystone Coal Industry Manual," p. 621, company annual reports and 10–K reports, and "Forbes," Nov. 15, 1974, p. 67.

[2] Source: Based on USGS Bulletin 1275.

EXHIBIT X

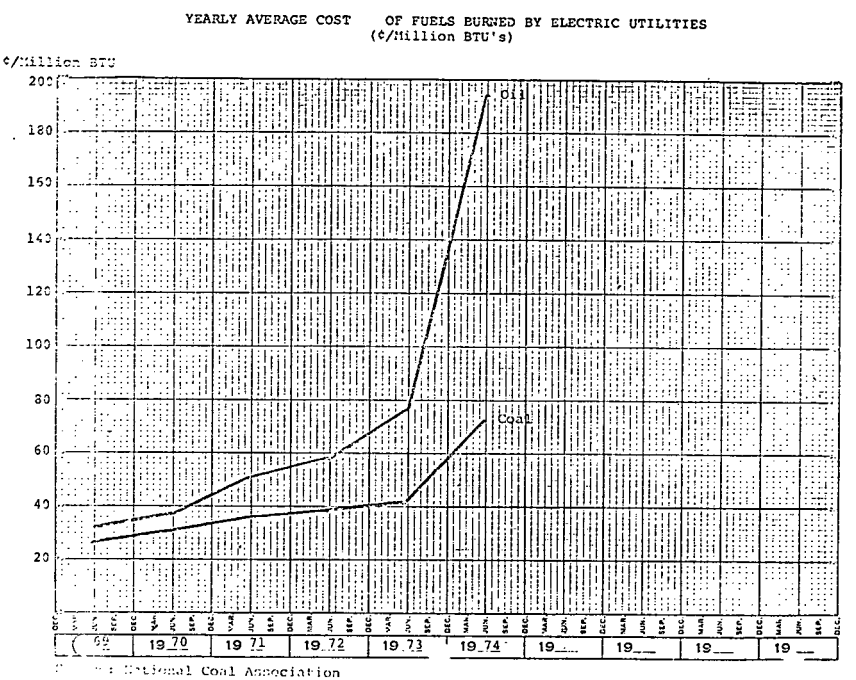


EXHIBIT XI

Concentration in Energy Production, 1974 (Btu Basis)

Share of Total Energy Production:	*Percent*
Largest firm	6.8
Top 4 firms	19
Top 8 firms	31

EXHIBIT XII

FORECAST OF ENERGY INVESTMENT

I. The Federal Energy Administration, for its Project Independence Blueprint, commissioned Arthur D. Little, Inc., to develop the investment outlays necessary to meet the energy demand conditions set out in detail below. Essentially, these capital investment figures assume a moderate growth in energy demand (A. D. Little's "low demand" case) and a stable level of oil and gas imports taken together through 1985.

II. Demand Assumptions:

GROWTH RATES IN ENERGY DEMAND BY PRIMARY SOURCE

	Historic 1960–73	Projected 1973–90
Oil [1]	4.4	1.0
Gas [2]	4.7	1.1
Coal	1.9	3.8
Nuclear		22.4
Hydro and other	4.5	4.2
Total energy	4.1	3.2

[1] Includes oil from shale and coal liquefaction.
[2] Includes gas from oil and coal.

TOTAL ENERGY DEMAND BY PRIMARY SOURCE

	Quad. Btu's		
	1973	1980	1990
Oil	35	37	41
Gas	23	23	28
Coal	13	18	25
Nuclear	1	6	28
Hydro and other	3	4	6
Total energy	75	90	128

SHARES OF ENERGY MARKET

[Amounts in percent]

	1973	1980	1990
Oil	46	41	32
Gas	31	28	22
Coal	18	20	19
Nuclear	1	7	22
Hydro and other	4	4	5
Total energy	100	100	100

SHARE OF IMPORTS

	1974	1980	1985
Oil (MM bbls./day):			
Domestic supply [1]	11.0	13.8	16.2
Imports	6.1	4.6	4.4
Percent imports	36	25	21
Gas (TCF/year):			
Domestic production [2]	21.7	22.2	22.7
Imports	1.0	2.3	3.5
Percent imports	5	9	13

[1] Includes oil from shale and coal liquefaction.
[2] Includes gas from oil and coal.

III. Energy Investment:

Energy Investment Requirements 1974–90

Energy source:	*Billion 1974 dollars*
Electrical	490–569
Nuclear fuel	19–30
Coal [1]	40–52
Oil and gas	334–352
Solar	8
Geothermal	8
Municipal waste conversion	8
Total	906–1,026

[1] Includes transportation and liquefaction and gasification facilities.

EXHIBIT XIII

IV. Coal Investment:

COAL CAPACITY ADDITIONS AND INVESTMENT COSTS

	Million annual tons			
	1973	1980	1985	1990
Annual capacity	599	893	1,019	1,895
	1973–80		1981–85	1986–90
New mining capacity:				
Underground expansion	75			
New underground mines	120		85	323
New strip mines	234		173	685
Total	429		258	1,008
	Billions of dollars			
Investment (1) (2):				
Underground expansion at $7 per ton	$0.5			
New underground mines at $20 per ton	2.4		$1.7	$6.5
New surface mines at $15 per ton	3.5		2.6	10.3
Total	6.4		4.3	16.8

(1) Assumes upper range of possible annual costs per ton. Lower range costs are: underground expansion @ $5/annual ton, new underground mines @ $17.50/annual ton, and new strip mines @ $10.00/annual ton. Total investment cost to 1990 in this case would be $20.5 billion.

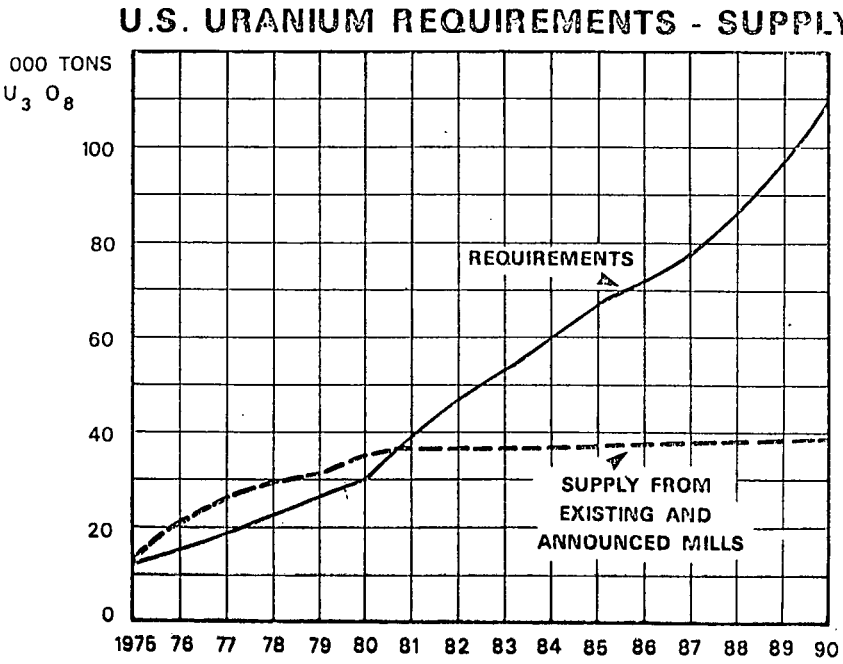
(2) Consol estimates of investment costs per annual ton of capacity are: New Eastern underground mine—$30/annual ton; Eastern surface mine—$30/annual ton; Western surface mine—$8/annual ton.

AVERAGE MINE SIZE AND NUMBER OF NEW MINES[1]

	Thousand tons per year			
	Mine size			
	Current average	New mines	Additional capacity needed	Number of new mines needed
Underground	150	2,000	528,000	264
Surface	100	5,000	1,092,000	218
Total			1,620,000	482

[1] Average size of new mines is based on Continental estimates.

EXHIBIT XIV



Chairman KENNEDY. Our final witness is F. M. Scherer, Director of the Bureau of Economics at the Federal Trade Commission until 1972. He was a professor of economics at University of Michigan and is now on a leave of absence from the department of economics at Northwestern University.

Glad to have you. We look forward to your testimony.

STATEMENT OF HON. F. M. SCHERER, DIRECTOR, BUREAU OF ECONOMICS, FEDERAL TRADE COMMISSION

Mr. SCHERER. Thank you very much, Senator Kennedy.

My formal statement is fairly long, so I will submit it for the record and summarize briefly its main points.

I have been asked to testify on the influence of the Federal Government as an energy resource proprietor on patterns of energy resource ownership and control.

The basis of my testimony is a report by the staffs of the FTC's Bureau of Competition and Bureau of Economics on Federal Energy Land Transfer Policy.

The report itself, which I have here, is about 700 and some odd pages. The testimony distills down to about 22 pages. I will distill it even further, so what we may end up with is a grin without a cat.

The Federal Government does play a major role as a holder of energy resources, especially in the Western United States and in the offshore areas. It depends upon the estimates, but it owns something on the order of 37 to 67 percent of the undiscovered oil resources. It owns 80 percent of the high grade oil shale. It owns about 40 percent

of our coal reserves and about half of our known high quality uranium lands.

Federal land transfer policies have had a major impact on patterns of private ownership, and they will, I think, in the future continue to play a major role. This role is most striking in the oil and gas sector.

Our offshore leasing policies have surely interacted with technical factors to enhance concentration of control, while onshore, the Federal Government's policies probably have had the opposite effect. In 1974, for example, the leading eight producers in each sector accounted for: One, 61 percent of total Federal offshore Outer Continental Shelf production. That is a very high fraction. Two, the leading eight producers accounted for about 53 percent of all U.S. petroleum liquids production on private and public lands. Three, they accounted for only 38 percent of all oil production on Federal onshore lands. Obviously, there are some differences in policy which affect the differences in concentration.

The key concentration increasing influence offshore has been a combination of substantial geological risks with the bonus bidding system, which requires very large front-end payments. With the escalation of oil prices and hence oil land values, plus the movement to new exploration frontiers, the risk problem attributable to front-end bidding systems will become even more serious. If we continue doing things the way we have in the past, it will discourage participation by all but the largest companies except in the form of joint ventures.

Now, how can this trend toward increasing concentration be headed off?

One way, the Federal Trade Commission staff believes is a new two-stage bidding approach.

Under this Federal land leasing approach, the cash bidding stage would be deferred until oil or gas deposits have already been discovered on a tract. The first exploratory stage would then require no front-end cash payment, and hence vigorous exploraton for new reserves would be encouraged. Those who discovered new reservoirs would be rewarded with a share of the competitively determined development bonus bid; that is to say, with what we call a discovery bonus share.

This new two-stage approach to leasing offshore oil and gas lands would, we believe, have three major effects.

First, it would encourage entry into offshore exploration by smaller firms, and hence lead to reduced concentration.

Second, by deferring the competitive bidding until one actually knows what he is bidding on, it would enhance Government revenues.

Finally, we believe such an approach would foster more extensive pluralistic exploration, and thus lead to the more rapid discovery of new reserves.

There are, of course, quite different problems in other resource areas such as coal, oil shale, uranium and geothermal reserves. The problems vary widely, but we believe, and we recommend in our report, that improvements can be made in Federal Government land leasing policies there, too. Those improvements, we think, will lead to a higher recapture of revenue by the Federal Government and to a more competitive industry structure.

These are covered at greater length in my prepared statement. I would be happy, Mr. Chairman, to elaborate on any of these proposals in response to your questions.

Thank you.

Chairman KENNEDY. Thank you very much.

[The prepared statement of Mr. Scherer follows:]

PREPARED STATEMENT OF HON. F. M. SCHERER

In a report issued last month, staff of the FTC's Bureaus of Competition and Economics analyzed the effects of Federal energy land policy on efficiency, government revenue, and competition.[1] My statement summarizes the report's findings with respect to the structure of the oil, gas, coal, oil shale, uranium and geothermal energy resource industries and suggests reforms which would enhance competition. I should note that the views expressed here are either my own or, when they are taken directly from the report, a consensus of the FTC staff members involved. They do not necessarily reflect any position adopted by the Commission.

FEDERAL ENERGY RESOURCE HOLDINGS

The Federal Government owns a substantial fraction of U.S. energy resources. Estimates of offshore resources as a percent of total U.S. undiscovered recoverable oil resources range from 30 percent to 62 percent.[2] Another 7.5 percent of U.S. oil resources are estimated to lie within Federally owned onshore lands.[3] The Federal Government owns about 80 percent of the Nation's high grade oil shale reserves, at least 40 percent of total U.S. coal resources, over half the known high quality uranium lands, and more than half of U.S. geothermal resources.[4] Since Federal land disposal policy will determine how these resources will be transferred to the private sector, it must also significantly affect the structure of the domestic energy industries.

IMPACT ON OIL AND GAS INDUSTRY STRUCTURE

The effect of Federal leasing policy on market structure is perhaps most evident in the oil and gas industry. The vast majority of Federal onshore leases have been issued noncompetitively for a nominal fee under the simultaneous filing system. Even lands overlying known geological structures, which are leased competitively, have attracted only modest winning bonus bids, averaging about $41 per acres.[5] Such low capital requirements have allowed easy access to Federal onshore lands. Concentration of oil and gas production from these lands has been lower than overall national oil and gas production concentration. In 1974, the eight largest domestic producers accounted for 47 percent of total U.S. crude oil and liquids production, but only 38 percent of production from Federal onshore lands.[6]

On the other hand, winning bids for Federal offshore leases have averaged $2,210 per acre.[7] In 1973, the average bonus cost per lease was about $16.5 million, compared to an average of less than $25 for onshore leases issued competitively.[8] The high bonus payments for leasing lands on the Outer Continental Shelf are significant because they are incurred before it is known whether or not a tract contains commercial quantities of oil or gas. In fact, almost 60 percent of the Federal OCS leases issued between 1954 and 1964 have been relinguished without having produced a drop of oil. About $400 million had been paid for the relinquished leases.[9] As bonus bids have risen in response to rising oil prices, the stakes have escalated dramatically. For example, a joint venture headed by Exxon spent $650 million for leases in the Gulf of Mexico's Destin

[1] U.S. Federal Trade Commission, Staff Report, *Federal Energy Land Policy: Efficiency, Revenue, and Competition* (October 1975).
[2] *Ibid.*, table 6.5, p. 305D.
[3] *Ibid.*, table 7.1, p. 426A.
[4] *Ibid.*, pp. iii–iv.
[5] *Ibid.*, table 7.5, p. 453A.
[6] *Ibid.*, table 7.4, p. 452A.
[7] *Ibid.*, p. 339.
[8] *Ibid.*, p. 343.
[9] *Ibid.*, pp. 342–343.

Dome which have apparently turned out to be dry.[10] Although lease bonus payments constitute by far the largest pre-discovery outlay, it costs about $1.5 million to explore a typical offshore tract in 1973.[11] This cost will be much higher in frontier areas such as the Atlantic Outer Continental Shelf and Alaska. Add to this the risk of a major oil spill and its attendant costs, and it is easy to see why relatively small oil companies have been deterred from entering the oil industry's offshore segment.

Large firms (those with total assets of $1 billion or more in 1970) accounted for 70 to 99 percent of the total dollar amount of winning bids for each year in which OCS lease sales were held.[12] Smaller, relatively undiversified firms appear unable to absorb the risk and capital requirements imposed by the bonus bidding system. They are either excluded altogether or enter to a limited extent as members of joint ventures.

Table 1 shows that concentration of oil production on the Outer Continental Shelf has been extremely high, but has been falling. In 1974, the four largest producers accounted for 43 percent of total Federal OCS production, the eight largest for 61 percent, and the 20 largest for 89 percent. As leasing begins on frontier areas of the OCS, concentration levels may rise again, since production from new regions tends to be highly concentrated.

Paralleling the overall nationwide situation, the concentration of OCS gas production is lower than the concentration of OCS crude oil production. Table 2 shows that Federal OCS gas production concentration has been falling since 1966. In 1974, the four largest producers accouned for 30 percent of Federal OCS gas production, the eight largest for 53 percent, and the 20 largest for 89 percent.

Although the difference has been narrowing, offshore oil and gas production remains much more highly concentrated than onshore production. The largest U.S. oil and gas producers overall also tend to be the largest OCS producers.[13] As OCS production accounts for an increasing proportion of total U.S. production, concentration in the overall U.S. market can be expected to rise.

Barriers to entry into offshore oil and gas production not only have increased production concentration, but have also encouraged the formation of joint ventures which engender a potentially anticompetitive mutuality of interest among energy firms. In addition, such barriers have limited the number of companies exploring for new sources of oil and gas. Of course, capital requirements and risk barriers to entry could be reduced by opening public lands for free exploration and granting the resources to the discoverer. But such a policy would prevent the public from obtaining fair compenstaion for the mineral lands thus transferred. The essence of the problem is to stimulate exploration by keeping exploration costs low while maintaining effective competition in the bidding for resources. This in turn implies: (1) waiting until discovery has occurred before soliciting development right bids; (2) keeping entry into the bidding open; and (3) making the maximum feasible amount of geologic information available to bidders.

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[10] *Ibid.*, p. 730.
[11] *Ibid.*, p. 345.
[12] *Ibid.*, p. 369.
[13] *Ibid.*, pp. 382–383.

TABLE 1.—CRUDE OIL AND NATURAL GAS LIQUIDS PRODUCTION, CONCENTRATION RATIOS: FEDERAL OCS AND TOTAL UNITED STATES, 1955–74 [1]

Year	Federal OCS			Total United States		
	CR_4	CR_8	CR_{20}	CR_4	CR_8	CR_{20}
1955				21.2	35.9	55.7
1956	98.5	99.8	[2]	[3]	[3]	[3]
1957	86.8	98.6	[2]	[3]	[3]	[3]
1958	73.1	90.9	[2]	[3]	[3]	[3]
1959	71.1	88.7	[2]	21.6	35.4	52.2
1960	71.3	90.9	100.0	23.9	38.2	57.6
1961	71.5	90.3	99.9	24.9	39.9	57.4
1962	68.9	86.3	99.9	26.3	41.4	58.8
1963	67.6	83.8	99.9	27.1	42.3	59.6
1964	70.4	87.4	99.8	27.6	43.2	60.6
1965	77.5	90.4	99.9	27.9	44.6	63.0
1966	79.3	89.5	99.7	29.3	47.4	67.8
1967	75.6	88.4	99.6	30.2	49.3	69.8
1968	72.0	85.0	98.7	30.1	49.5	71.2
1969	65.6	80.4	97.2	31.2	49.9	71.9
1970	60.2	74.3	94.1	31.0	49.1	69.0
1971	53.1	67.9	91.4	34.1	52.7	75.7
1972	52.2	66.7	91.5	34.0	52.8	76.0
1973	48.3	64.1	89.5	[3]	[3]	[3]
1974	43.4	60.6	88.7	[3]	[3]	[3]

[1] Production from each lease was allocated to the original leaseholder.
[2] Fewer than 20 firms accounted for 100 percent of production.
[3] Not available.

Source: U.S. Federal Trade Commission, "Federal Energy Land Policy: Efficiency, Revenue and Competition" (October 1975), p. 378A.

TABLE 2.—NATURAL GAS PRODUCTION CONCENTRATION RATIOS: FEDERAL OCS AND TOTAL UNITED STATES, 1960–74 [1]

Year	Federal OCS			Total United States		
	CR_4	CR_8	CR_{20}	CR_4	CR_8	CR_{20}
1960	93.8	99.9	[2]	17.0	28.7	45.7
1961	92.9	99.6	[2]			
1962	67.7	84.9	[2]			
1963	60.8	82.8	[2]			
1964	66.6	83.4	100.0			
1965	60.7	82.5	99.9	21.4	34.5	53.2
1966	66.5	88.3	99.9			
1967	59.4	83.4	99.5			
1968	60.8	83.3	99.3			
1969	53.1	75.9	95.7			
1970	47.4	70.2	95.2	25.6	40.7	59.8
1971	39.0	63.4	93.2			
1972	37.2	61.2	93.1	27.6	42.0	60.9
1973	33.6	57.2	90.8			
1974	30.2	52.9	88.7			

[1] Production from each lease was allocated to the original leaseholder.
[2] Fewer than 20 firms accounted for 100 percent of production.

Source: U.S. Federal Trade Commission, "Federal Energy Land Policy: Efficiency, Revenue and Competition" (October 1975), p. 379A.

One possible approach which will be used in early Atlantic OCS exploration is the Interior Department's Stratigraphic Drilling Program. Under it, potential bidders are allowed to form consortia for the purpose of drilling one or two geologic test holes. Such drilling provides information indicating whether or not an area is likely to contain commercial oil or gas deposits. Any company that desires to join the group can enter. The principal operator must advertise that it is going to conduct the drilling. Anyone can participate by paying its share of the costs. Companies may join even after the drilling has been conducted, provided they pay up to 200 percent of the pro-rata cost. The geologic data are reported to the U.S. Geological Survey as well as the participants, and they are made public after five years or 60 days after a lease sale takes place within 15 miles of the test site.

The benefits of the Stratigraphic Drilling Program are that: (1) it reduces the risk of bidding on leases, since more geologic information is known about the area to be leased; (2) it provides the USGS with information valuable in setting minimum acceptable bids; and (3) it provides information necessary for wise selection of the areas to be leased and the rate of leasing. These benefits are limited, however, because the exploration permitted is neither extensive nor pluralistic enough to ensure adequate exploration and sufficient reduction of risk barriers to entry.

A PROPOSED NEW BIDDING SYSTEM

To reduce barriers to entry into offshore oil and gas operations, stimulate exploration, and enhance the Federal Government's leasing revenues, the FTC staff has proposed a new two-stage competitive bidding procedure, which we call the TSCB system. Under TSCB, exploration rights and development-production rights would be granted in separate actions. The first stage would work in either of two ways:

(1) The rights to explore a tract would be open to all responsible firms. The firm that makes a discovery would receive a share of the winning bonus bid when the development and production rights are auctioned off in the second stage. This share, called the discovery bonus share (DBS), would be set at a level that would compensate the discoverer for the costs of exploration, including the average cost of dry holes. The appropriate DBS level would depend upon the expected level of bonus bids and the costs and risks of exploration.

If there were so much interest in a tract that it would be overcrowded with explorers, the exploration rights could be auctioned off on the basis of discovery bonus shares. The rights would be awarded to the firm that bids the lowest DBS, i.e., the firm that agrees to accept the lowest share of the bonus payment received if valuable resources are discovered and a second-stage auction of development-production rights is held.

(2) Alternatively, exploration rights on all tracts could be awarded by competitive bidding on the basis of discovery bonus shares. This would avoid the task of setting the proper DBS administratively. The principal disadvantage of this method is that firms would have an incentive to explore first those tracts which they had won with especially high DBS bids, rather than the tracts with the greatest inherent geological promise.

Once a discovery is made, the second stage of the TSCB system comes into play. The rights to develop and explore the tract would be awarded in a competitive lease sale similar to conventional bonus bidding lease sales. There are two important differences. First, a share of the winning bonus bid (the discovery bonus share) is awarded the firm that discovered oil or gas on the tract. If the discovering firm bids on development-production rights, it will receive an advantage against other bidders, based on its DBS. If it still fails to win the lease or if it chooses not to enter the second-stage bidding, it receives a direct cash payment.

The second and more important difference between the second stage of the TSCB system and conventional bonus bidding is that the bidders have far greater knowledge of the value of what they are bidding on. Firms awarded exploration rights in the first stage would be required to report comprehensive geologic information, including core logs and flow test data. The discovering firm would be required to drill a sufficient number of wells to estimate the magnitude of the deposit. All such information would be made available promptly for public inspection. The discovering firm would be compensated for the costs of exploratory drilling by its discovery bonus share.

The TSCB system reduces both front-end costs and risks, and hence lowers barriers to entry. However, because of the risk reduction and enhanced competition for leases, development rights bonus bids would rise significantly. Therefore, it would appear desirable to permit at least smaller firms to spread their bonus payments over a series of installments—e.g., over a five-year period. This would lessen early capital requirements and would allow smaller energy firms to reduce risks further by diversifying their exploration and development efforts over a larger number of tracts.[14] The end result should be a more competitively structured oil and gas industry than that which is likely to evolve if the present bonus bid leasing system is retained.

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[14] For a more detailed explanation of the TSCB system, see *ibid.*, pp. 733–743.

ONSHORE OIL AND GAS

Although reforms in Federal Government offshore oil and gas tract leasing policy appear most urgently needed if increasing concentration is to be avoided, changes are also warranted in other sectors.

The land disposal methods used for onshore oil and gas tracts have not had a perceptible adverse impact on industry structure. However, the simultaneous filing system leaves much to be desired from the standpoint of securing for the public the fair competitive value of mineral exploitation rights. It is little more than a lottery in which the Government receives next to nothing while speculators and middlemen profit. We believe it should be replaced by a two-stage competitive bidding system with open exploration and administratively determined discovery bonus shares. This would permit the Government to capture a significant share of the rents from valuable tracts while confining the administrative costs of holding a competitive lease sale to those cases where oil or gas is actually discovered. The next best policy would be competitive bonus bidding, although royalty bidding might be used for an appreciable fraction of the tracts in wildcat areas.

OIL SHALE

The fact that the winning bidders in the 1974 prototype oil shale lease sale were joint ventures of oil companies suggests that this new industry will be highly concentrated in its early years. There are extremely high risk and capital requirements barriers to entry. The risk is not attributable to uncertainty about the location and quality of resource deposits, as in oil and gas, but to the as-yet unproved technology for producing shale oil that can compete with imported oil at current and prospective OPEC prices. Capital requirements include not only payments of $45 million to $210 million for leases, but also estimated costs of $500 million to $800 million for processing plant.[15]

Under these circumstances, the best Government strategy would appear to be one of reducing these uncertainties before commencing a large-scale oil shale leasing program. Only enough land should be leased to permit a trial for the most promising technologies. Most of the Government's vast oil shale reserves should be retained for later leasing under procedures which encourage the emergence of more competitive industry structure. To afford subsequent new entrants access to the best technologies, the Government should insist upon the right of order compulsory licensing of patents and know-how at reasonable royalties in exchange for R&D support, price guarantees, or other substantial subsidies to private developers.

COAL

Barriers to entry into coal mining have historically been low. Exploration (including leasing) and development costs are relatively low. There is little technological risk. The greatest risks presently flow from the uncertainty over Government air pollution and land reclamation policies.

Concentration of coal production is also relatively low. The four, eight and 20 largest producers accounted for approximately 30, 40, and 56 percent respectively of national production in 1973.[16] The concentration of Federal leaseholdings is somewhat higher. In 1974, the four largest holders of reserves on Federal lands accounted for 35 percent of total leased Federal coal reserves in the West; the eight largest for 57 percent; and the 20 largest for 82 percent.[17]

Although Federal coal lands disposal policy has not greatly affected the structure of the coal industry thus far, it will have a more pronounced effect as the demand for Western coal increases. With the value of coal rising in response to generally increased energy resource prices, the preference right leasing system must be abolished if the public is to receive the fair market value of its coal lands. The most suitable replacement would be a two-stage competitive bidding system. Since core drilling is relatively inexpensive, discovery bonus shares could be determined competitively, with a maximum level of perhaps ten percent. Alternatively, conventional bonus bidding could be enforced, but only after tracts have been explored—if need be at Government expense—and the relevant data made available for analysis by potential bidders.

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[15] *Ibid.*, pp. 490, 495A.
[16] *Ibid.*, p. 551.
[17] *Ibid.*, pp. 631, 632.

URANIUM

Current levels of uranium oxide production and reserve concentration are very high. Eight companies control over 75 percent of the uranium reserves available at or below a cost of $8 per pound of concentrate. Twenty-five firms control 95 percent of the reserves.[18] This high level of concentration may be due simply to the fact that exploration for uranium ore reserves is at a relatively early stage. It would be hard to argue that the Government's land disposal policies are to blame for high concentration, for under the applicable "location" or claim-staking system, mining rights can be obtained by anyone who does a modest amount of exploration work and pays a token fee.

Indeed, as uranium lands have increased rapidly in value, the 19th Century claim-staking system becomes less and less appropriate. A much better way of encouraging needed exploration and ensuring that the Government receives fair value for its lands would be an adaptation of two-stage competitive bidding. At the first stage, open exploration with an administratively fixed discovery bonus share appears most suitable. For the second stage, development rights should be awarded on the basis of competitive bonus bidding. Given the high level of uncertainty concerning long-run uranium oxide price trends, an appreciable fixed royalty should also be included in the lease terms.

If concentration levels do not decline substantially as the uranium mining and milling industry grows, the Government should seriously consider limiting the number of acres (or quantity of reserves) that can be held by one company. It might also promote the growth of smaller enterprises by extending preference—e.g., through a modest bonus bid discount—in favor of newly entering firms and firms below some size threshold.

GEOTHERMAL RESOURCES

Like the shale oil industry, the geothermal steam industry is in its infancy. Technological uncertainty is substantial, as in shale processing. But unlike oil shale, there are also appreciable geologic uncertainties. The Government can encourage the industry's early development by granting geothermal resource leases to firms with the most promising technologies. As the technology is proved, emphasis should shift to encouraging vigorous exploration and Government receipt of geothermal reservoirs' fair value through an adaptation of the two-stage competitive bidding approach.

INTER-FUEL COMPETITION

In our study of the effects of Federal energy land policy, we have focused on the individual energy resource sectors. Still, the various energy resources are good substitutes, and they are becoming increasingly better substitutes in many uses. For electricity generation in particular, the relative prices of oil, natural gas, coal, and uranium are close enough to place them in actual or potential competition with one another.[19] Therefore, we must be concerned with the level of concentration in the overall energy market, and inter-fuel mergers should frequently be viewed as horizontal mergers. In the national energy market comprising the four basic fuels combined, table 3 reveals, concentration is lower than the average level of concentration in the four fuels considered separately.

Nevertheless, most of the major petroleum firms have been acquiring interests in coal and/or uranium reserves. Energy production concentration has already exhibited an increasing trend, and it may continue to rise if the leading petroleum companies persist in their efforts to encompass a broader array of energy resources.[20]

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[18] *Ibid.*, pp. 684, 685.

[19] U.S. Federal Trade Commission Staff Study. *Interfuel Substitutability in the Electric Utility Sector of the U.S. Economy*, by Thomas D. Duchesneau (Washington: U.S. Government Printing Office, 1972).

[20] U.S. Federal Trade Commission Staff Report. *Concentration Levels and Trends in the Energy Sector of the U.S. Economy*, by Joseph P. Mulholland and Douglas W. Webbink (Washington: U.S. Government Printing Office, 1974).

TABLE 3.—PRODUCTION CONCENTRATION RATIOS FOR THE 4 MAJOR FUELS AND FOR THE COMBINED ENERGY MARKET, 1955, 1960, 1965, 1970 (PERCENT)

Concentration ratio and industry [1]	1955	1960	1965	1970
4-firm:				
Crude oil	21.2	23.9	27.9	31.0
Natural gas	18.6	16.7	18.9	24.4
Coal	17.8	21.4	26.5	30.7
Uranium	77.9	51.4	55.4	55.3
Energy (Btu.'s)	12.6	12.5	15.6	19.0
Energy (dollars)	16.1	17.7	20.9	23.4
8-firm:				
Crude oil	35.9	38.2	44.6	49.1
Natural gas	30.4	27.7	31.2	39.1
Coal	25.4	30.5	36.3	41.2
Uranium	99.1	72.4	79.3	80.0
Energy (Btu.'s)	22.0	22.5	26.1	31.6
Energy (dollars)	27.2	29.1	34.0	37.8
20-firm:				
Crude oil	55.7	57.6	63.0	69.0
Natural gas	48.1	44.4	48.6	57.6
Coal	39.5	44.5	50.1	56.4
Uranium	100.0	99.6	100.0	100.0
Energy (Btu.'s)	38.1	39.4	43.2	51.1
Energy (dollars)	43.3	47.4	50.8	57.2

[1] Note: Natural gas production includes United States and Canada. Uranium concentration is measured at the milling stage.

Source: U.S. Federal Trade Commission, "Concentration Levels and Trends in the Energy Sector of the U.S. Economy," by Joseph P. Mulholland and Douglas W. Webbink (Washington: U.S. Government Printing Office, 1974), p. 148.

TABLE 4.—THE 20 LEADING WINNERS OF COMPETITIVELY LEASED FEDERAL COAL ACREAGE IN 7 WESTERN STATES, 1960–74 [1]

Rank and company	Acreage	Percent
1 Sun Oil Co.	21,240	7.2
2 Richard D. Bass	20,401	7.0
3 Sentry Royalty Co	19,170	6.5
4 Peter Kiewit & Sons	16,407	5.5
5 Exxon Corp	15,490	5.2
6 W. Brannan	15,445	5.2
7 Atlantic Richfield	12,716	4.3
8 Kemmerer Coal Co. (Lincoln Corp.)	12,400	4.2
9 Kerr-McGee	9,992	3.4
10 Nevada Electric Investment Co. (Nevada Power Co.)	9,899	3.3
11 Pacific Power & Light Co	9,130	3.1
12 U.S. Steel	8,887	3.0
13 Energy Development Co. (Iowa Public Service)	8,683	2.9
14 J. D. Karcher	8,031	2.7
15 Peabody (Kennecott)	6,350	2.1
16 Arkland Minerals Corp. (Ashland Oil & Hunt Enterprises)	6,315	2.1
17 Malcolm & Armeda, McKinnon	6,076	2.1
18 Heiner Coal Co. (Occidental Petroleum Corp.)	6,315	2.0
19 American Metal Climax	5,960	2.0
20 Paul F. Faust	5,884	2.0
Total (all leaseholders)	295,656	----
4 largest	77,518	26.2
8 largest	133,569	45.2
20 largest	224,795	76.0

[1] Based upon data for 142 of the 146 competitive leases let from 1960 to 1974.

Source: U.S. Federal Trade Commission, "Federal Energy Land Policy: Efficiency, Revenue and Competition" (October 1975), p. 634A.

Table 4 shows that petroleum companies are major holders of competitively leased Federal coal lands. The winning bidders in the prototype oil shale leasing program were joint ventures of oil companies. Eight of the nine winning bonus bidders in the first eight Federal geothermal lease sales and ten of the 17 high bidders in subsequent sales were petroleum companies.[21] Several of the 25 largest uranium mining and milling companies are also petroleum companies.[22]

[21] U.S. Federal Trade Commission, *Federal Energy Land . . ., op. cit.*, p. 712.
[22] *Ibid.*, table 10.5, p. 684A.

With vast unleased oil, gas, coal, uranium, and geothermal resources, the Federal Government is uniquely well situated to ensure that unacceptably high levels of overall energy resource production and reserve concentration do not emerge. One thing that hampers its performance of this role is the inadequacy of systematic information on current reserve concentration levels. The FTC's Energy Study Unit has sent 6(b) questionnaires and subpoenas to the largest coal, uranium, and natural gas producers in order to obtain a more accurate picture of reserve concentration levels and trends.

Even when that information is in hand, difficult factual and policy questions will have to be resolved. For one, it is important to ascertain whether the participation of leading petroleum companies contributes positively to the development of alternative energy resources. In such high-investment, high-risk sectors as oil shale and coal gasification, it is possible that the rate of technological advance might be retarded if the participation of major petroleum companies were barred. And any exclusion of interested participants from the competitive bidding for Government energy resources is likely to mean lower bonus bid receipts. A trade off may have to be struck between rapid resource development, securing the fair market value of the Government's energy resources, and the maintenance of pluralistic, competitively structured energy industries. Studies presently underway in the FTC's Energy Unit seek among other things to illuminate the contours of those tradeoffs. And finally, some tough choices will have to be made as to how high overall energy resource industry concentration should be permitted to rise. Economic analysis can help here, but it is not powerful enough to identify the precise point at which breakdowns of competition will materialize on an unacceptable scale. My personal view, and it is no more than that, is that the combined energy market concentration levels reflected in table 3 do not yet approach the peril point. But further increases would begin to breach that range in which serious breakdowns of competition are threatened.

Chairman KENNEDY. Mr. Scherer, perhaps you could address yourself to some of the points that Mr. Hardesty made during the course of his presentation in terms of the competitive aspects, not only within the oil industry itself but also in the alternative sources of energy, and whether the proliferation of different sources of energy are sufficiently numerous really to guarantee a free-flowing and active competitive marketing situation.

Could you talk a little bit about that factor and what your study showed?

Mr. SCHERER. Well, yes. Let me make several points.

First of all, there is much lower concentration in the holding or production of energy resources when one puts together all the various main energy resources like crude oil, natural gas, coal, and uranium, than when one looks at the individual sectors separately.

In 1970, according to a study our staff did, the leading eight energy companies accounted for something like 32 percent of the Btu production of all the major energy sources.

The second point that can be made is that this fraction has been increasing over time. In 1955, the same figure was 22 percent. So in the 15 years between 1955 and 1970, the position of the leading eight energy producers went from 22 percent to 32 percent of our Btu energy resource production.

Now, the next question is: Is this high or is it low? Does 32 percent control by the leading eight firms mean a high level of competition or a low level of competition?

Mr. Hardesty believes that it led to a high level of competition. I think that by the standard criteria of industry analysis, Senator, that would be a correct statement. That is to say, when the eight firm concentration ratio is 32 percent, we usually believe that we have a pretty

good industry structure, and it ought unless there are explicit collusive agreements, to function competitively.

There is, however, a special problem in the energy field, and that is, we have the very extensive execution of joint ventures. Most of the major energy companies are intertwined in a myriad of ways with other energy companies.

It is fair to say that no one really knows what the full implications are of these intricate interlocks through joint ventures. It is my own impression that they do lead to a cooperative spirit which would not exist if the companies were independent. Whether the combination of the levels of concentration we have plus the extensive intertwining through joint ventures is enough completely to suppress competition, I do not know. I'm sure there is some competition.

I think, however, that the interlocks through joint ventures are a serious problem. I think, too, that the trend towards increasing concentration is a problem. I believe the combination of the two could over the longer run lead to very serious competitive breakdowns.

Chairman KENNEDY. Perhaps we could go into that a bit.

I understand many economists are generally—are unconcerned about competition in the energy industry because the concentration is relatively modest. But the industry critics believe that these joint ventures and interlocking relationships you described here provide opportunities for cooperation in commercial decisions that effectively vitiate against competition.

I'm just wondering where you come out as far as your concern about the prevalence and the effect of joint ventures and other interlocking devices?

Mr. SCHERER. It is terribly hard to assess quantitatively what these effects are. It is like the problem of the Japanese Zaibatsu before World War II.

Big business in Japan was all intertwined through holding corporations. That phenomenon has been studied again and again, and no one has ever come up with a definitive solution as to what impact the Zaibatsu had on cooperativeness and the degree of competition among the Japanese firms.

I have seen one oil industry study that tried some quantification, however. This was a study of joint ventures for offshore oil and gas drilling, which was conducted by Darius Gaskins and a colleague in the Department of the Interior. What they found first of all, was that joint ventures provided a mechanism by which the various companies could find out who was interested in a particular tract of land being offered for sale. They found out, furthermore, that when the firms learned that there were relatively few bidders interested in a particular tract, that influenced their bidding. They found, indeed, that when only a couple or three bidders bid on a particular tract, the bids were noticeably lower than the bids where a substantial number of bidders were involved.

There is also some evidence in our own report that companies which bid independently, that is to say, alone, on offshore tracts tended to submit higher bids, all other things being equal, than groups of companies bidding on a joint venture basis.

This is the only quantitative evidence I know of. It suggests, however, that joint ventures do indeed make a difference.

Chairman KENNEDY. What is your reaction to Mr. Hardesty's point that the level of concentration in the oil industry did not act to restrict access into the industry, for example, in refining?

Mr. SCHERER. Historically, the problem on access to refining, Senator, has not been so much the level of horizontal concentration, but the incentives created by the vertical relationships, which stemmed in part from vertical integration and in part from the oil depletion allowance.

As one of the previous witnesses said, this combination led to a tendency to try to take profits at the crude oil production stage. That sometimes in turn had the effect of squeezing margins at the refining stage. And that squeeze very definitely had some effect of discouraging entry into the refining stage.

Chairman KENNEDY. What is your reaction to the trend, or is there a trend of increased concentration in the areas of competing fuels by the major oil companies, particularly in uranium and to somewhat lesser extent in coal?

Are you alarmed by this, or how far do you think it is going to go?

Mr. SCHERER. Well, let's take uranium first. That is a hard one to analyze. When uranium got started as an industry some 30 years ago, the concentration was quite low. There was a huge wave of people who went into uranium prospecting. The concentration rose in the 1960's when there was a shakeout from the industry because the Defense Department found it had just about all the uranium it needed for nuclear weapons and the powerplant industry hadn't taken up the slack.

That led to a huge shakeout of producers from the industry, and concentration rose.

Now the situation has changed again. Uranium oxide prices have gone up very rapidly in the past few years. There is excess demand. Powerplant builders cannot get enough uranium to fuel their plants. This should induce a wave of entries into the industry that ought to bring concentration down substantially. Now whether that will happen or not, I do not know. That is something we want to watch very carefully, because if concentration does not start coming down, then I think there will be a serious problem indeed.

Chairman KENNEDY. Suppose the oil companies' production of coal and uranium grows to the companies' present share of privately held reserves, for example, about 40 percent of the coal and about 50 percent of the uranium. Now would this be a cause of much concern? Would you regard this to be a threat to competition? What if the oil companies continue aggressively to acquire reserves in the competing fuel industry?

Mr. SCHERER. It is one of those problems, Senator, that is on the borderline. First of all, it is on the quantitative borderline; that is to say, right now maybe it is not a problem but if carried much further, it could become a serious problem. It is also on the borderline in terms of our knowledge of how companies behave in such situations.

As I said before, we really do not have a very good understanding of how the interrelationship of companies through joint ventures, and

also of how the interpenetration into different energy resources, affects their behavior. We are trying to study this phenomenon at the FTC right now.

I sincerely hope that in a year or two years, when the results of our present studies come out, Senator, we will have a pretty good idea of how the oil companies behave as they move into coal or how they behave as they move into uranium, or as they move into geothermal resources and similar resources.

Chairman KENNEDY. How far do you think they can go without posing a threat?

Mr. SCHERER. Pardon me?

Chairman KENNEDY. How far can they go in control of these alternative sources of energy before you really reach the threat stage to the public?

Mr. SCHERER. That is a hard judgmental question. My personal judgment is that I do not think they should be going any further. I would be very much concerned. In coal for example, 5 or 6 of the leading 20 producers are oil companies. Much further than that, Senator, and one loses the benefits of pluralism; loses the benefits, that is to say, of a diversity of incentives for each to go its own separate way.

Chairman KENNEDY. Mr. Scherer, we want to thank you very much for your appearance here and your testimony. We look forward to examining it in very considerable detail.

[The following letter was subsequently supplied for the record by Mr. Scherer in the context of the above interrogation:]

FEDERAL TRADE COMMISSION,
Washington, D.C., November 24, 1975.

Hon. EDWARD M. KENNEDY,
Chairman, Subcommittee on Energy, Joint Economic Committee, G–133 Dirksen Senate Office Building, Washington, D.C.

DEAR SENATOR KENNEDY: I should like with your permission to expand upon my answer to the last question you raised during my testimony November 19, since the answer I gave does not deal with the range of possible ways petroleum companies might increase their control over alternative sources of energy.

One way is through the acquisition of companies previously supplying some non-petroleum energy resource—e.g., a coal or uranium mining firm. In my opinion, any new and substantial acquisition of such an enterprise by a major petroleum company would threaten a substantial lessening of competition.

At the other extreme of the spectrum would be the acquisition of rights to mine previously undeveloped non-petroleum energy resources held by persons (e.g., the Federal Government or ranch owners) unlikely to enter the mining business. In that instance, the acquisition of mining rights and the actual conduct of mining on an appreciable scale would tend to have beneficial effects both in terms of competition and the expansion of supply. Banning petroleum companies from bidding on Federal Government energy resource lands might also have the undesirable consequence of reducing the Government's revenue from land transfers. I would therefore oppose a general ban of such diversification by petroleum companies. However, I believe that increases in petroleum company holdings of such a magnitude as to increase concentration in other energy resource sectors significantly would be undesirable. Similar reasoning prompted our energy staff to conclude at p. 759 of its report on Federal Energy Land Policy that "from the standpoint of maintaining the most competitive market structure possible, there is something to be said for overall nationwide limits on a company's Federal coal holdings. Any such limit should be related to and based upon comprehensive data concerning the ownership of coal resources in both the Federal and non-Federal domains."

Intermediate between these two cases is the acquisition of already assembled but not yet developed energy resource lands by a major petroleum firm from a company which is a potential entrant into the development of the lands. I would be opposed to substantial acquisitions of this nature absent compelling evidence that the original resource holder was unable or unlikely to develop the resource.

I am grateful for the opportunity to testify before the Subcommittee, and I wish you success in the conclusion of your hearings.

Sincerely yours,

F. M. SCHERER,
Director, Bureau of Economics.

Chairman KENNEDY. We will stand in recess until December 8, 1975. We have an executive session of the Senate and will be unable to hold the hearing scheduled for tomorrow.

The hearing is recessed.

[Whereupon, at 12:20 p.m., the subcommittee recessed, to reconvene at 9 a.m., Monday, December 8, 1975.]

HORIZONTAL INTEGRATION OF THE ENERGY INDUSTRY

MONDAY, DECEMBER 8, 1975

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON ENERGY
OF THE JOINT ECONOMIC COMMITTEE,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:15 a.m., in room 1202, Dirksen Senate Office Building, Hon. Edward M. Kennedy (chairman of the subcommittee) presiding.

Present: Senator Kennedy and Representative Rousselot.

Also present: William A. Cox, professional staff member; John Stewart, subcommittee staff member; Steven Entin, legislative assistant to Senator Taft; Gary Klein, legislative assistant to Senator Javits; and George D. Krumbhaar, Jr., minority counsel.

OPENING STATEMENT OF CHAIRMAN KENNEDY

Chairman KENNEDY. The Subcommittee will come to order.

This hearing is a continuation of the Subcommittee on Energy's examination of the extent and significance of control by oil companies over competing energy sources, such as coal, uranium, and geothermal steam, and how the Federal Government should deal with this trend in framing a national energy policy.

The issue of horizontal concentration of the energy industry is important. Whoever controls our energy resources effectively controls the lifeblood of the American economy. Whoever controls our economy is certain to have a major, if not decisive, impact on the future security and happiness of the American people. This issue clearly requires congressional scrutiny and action.

At the Energy Subcommittee's initial hearing on this subject, we heard testimony that documents the unmistakable trend toward integrated control over competing energy sources by major oil companies. This is a trend that has been accelerating in the past 10 years. Moreover, joint ventures and other corporate interlocking arrangements are now a major factor in lessening the degree of competition within the energy industry.

As one of our earlier witnesses noted:

> Whether or not a market is competitive depends upon whether there is an adequate number of truly independent and self-motivated sellers. Without independence, self-interest binds interdependent sellers together in the mutual pursuit of common objectives which are unlikely to conform to the broader public interest in sufficient supplies at reasonable prices.

We have also heard testimony to the effect that acquisition of competing energy sources by major oil companies will ultimately prove to be in the best interests of energy consumers. This argument rests on the proposition that the injection of capital resources and the technical expertise of major oil companies into the development of alternate fuels will increase production, develop new fuels technology, increase employment opportunities, and lessen U.S. dependence on imported oil. Proponents of this view also maintain that the oil industry is highly competitive in comparison to such industries as automobiles and aluminum, and that oil company diversification will provide more, rather than less, competition.

Finally, we have been told that while an adequate degree of competition may presently exist among major energy producers and in the development of competing fuels by these producers, we are approaching levels of concentration in certain areas that could have harmful effects on future competitive behavior. In other words, we are near the peril point in the evolution of the structure of the energy industry and Congress should exercise great vigilance in assessing these disturbing trends.

In evaluating this often contradictory testimony, I am struck by the inadequacy of any analysis of oil industry structure that is limited to traditional antitrust considerations or to narrow economic definitions of what supposedly constitutes a competitive market structure. The issue that now confronts Congress by the acquisition of competing energy sources by major oil companies cannot be resolved simply by counting the number of companies and their energy subsidiaries and comparing this number to what exists in other, quite different, industries. One must look very carefully at the end result of the process where alternative energy sources are increasingly controlled by what could be described as energy conglomerates.

One must ask, for example, whether it is reasonable to expect that an energy conglomerate would permit its coal subsidiary to undersell its oil subsidiary in bidding for an electric utility contract?

If this is not a reasonable expectation from a corporate point of view, can we expect such energy conglomerates to expand output of competing fuels aggressively so as to weaken the grip of the OPEC cartel and bring us more reasonable oil prices? Isn't it more likely that such an energy conglomerate will view its economic self-interest to be better served by doing everything possible to maintain the cartel price?

Further, if one is trying to bring energy resources into the market at lower prices, can we condone the acquisition of large shares of all competing energy sources by the same complex of major producers with obvious vested interests in maintaining the world price?

In addition to these questions about the lack of incentives for energy conglomerates to expand domestic energy production and lower domestic prices, we must be concerned over the impact of horizontal concentration on governmental decisions relating to future energy sources. As previously competitive segments of the energy industry, oil and coal, for example, speak increasingly with a voice that reflects the common interests of their conglomerate owners, Congress and the executive branch may find their policy choices increasingly restricted to

those that primarily serve the interests of energy producers rather than energy consumers.

Major oil companies, for example, now control about 40 percent of the domestic coal reserves in private hands. Given the fact that domestic oil reserves are declining and the world price of oil is climbing, what are the economic incentives for oil companies to bring these reserves into production as rapidly as possible? And how do these incentives compare to the alternate choice of holding these reserves in the ground while simultaneously advocating governmental support for technology that can transform coal into synthetic and high priced substitutes for petroleum? Will this advocacy by energy conglomerates reduce the likelihood that government will channel investment capital into improved coal mining and transportation technologies? And where do these decisions leave the energy consumer who seeks only the most efficient, economical, and environmentally safe fuel sources?

These are the type of questions that, to my mind, are not settled by analyzing the problem of horizontal concentration simply in terms of traditional antitrust considerations. It is equally clear, at least to me, that our energy future will be most effectively secured by an industrial structure that seeks to develop the inherent economic advantages associated with alternative sources of energy rather than one that has a vested economic interest in limiting this natural competition.

The problem for Congress is to define the components of this competitive industrial structure and then determine the most sensible way of achieving it.

The witnesses appearing today before the Energy Subcommittee are well qualified to help us understand more clearly this admittedly complex problem. The panel is comprised of Walter Adams, distinguished professor of economics, Michigan State University, and Thomas G. Moore, senior fellow, the Hoover Institution of War, Resolution and Peace, Stanford University.

Due to the rescheduling of this hearing and to the hearing later this morning by the Judiciary Committee on the nomination of Judge Stevens to the U.S. Supreme Court, two witnesses who prepared written statements are unable to appear.

Before we hear our first witness, I ask unanimous consent that Senator Taft's opening statement, and the three charts and a table I wish to submit, which are relevant to the hearing, as well as the very informative prepared statements by Paul Davidson, professor of economics, Rutgers, the State University of New Jersey, and by Aubrey J. Wagner, Chairman of the Board, Tennessee Valley Authority, be printed in full at this point in the hearing record.

[The material referred to follows:]

OPENING STATEMENT OF HON. ROBERT TAFT, JR., A U.S. SENATOR FROM THE STATE OF OHIO

HORIZONTAL CONCENTRATION IN THE ENERGY INDUSTRY

One question we are asking at this hearing is, will the public be injured if certain companies are allowed to do business in more than one field of energy development?

The argument is that monopoly could develop, and one energy source could be restricted, either for monopoly profits in that industry, or to create excess profits

in the case of the other fuel. This would be sort of a double jeopardy situation.

Are there any oil companies large enough in their share of the coal market to significantly reduce coal production and foster monopoly prices in coal? Would these be large enough to compensate them for the output loss on their coal operations? Is there a small group of such companies?

If the monopoly situation is stronger in oil, could a group of oil companies cut back on coal, and via the price elasticity of demand for coal, so raise its price, and via the elasticity of substitution between coal and oil, and via the price elasticity of demand for oil, so increase the price of oil, that, given their share of the oil market, they would gain more on the oil than they would lose cutting their coal output?

Wouldn't they have to cut back on coal production almost 100 percent in their mines to make much of a dent in output and to drive prices up? And insofar as this had some impact on oil prices, an impact limited by the world price, wouldn't their small share of the oil market limit their gains from such an action to the point where they would make more profit running the coal mines in a normal fashion?

There is a moderately large oil company which owns the country's third largest coal company, in terms of sales. This is the largest coal company in terms of profit, however. The oil company is investing more money in its coal subsidiary, and is planning to construct enough new mines to increase capacity 40 percent in ten years.

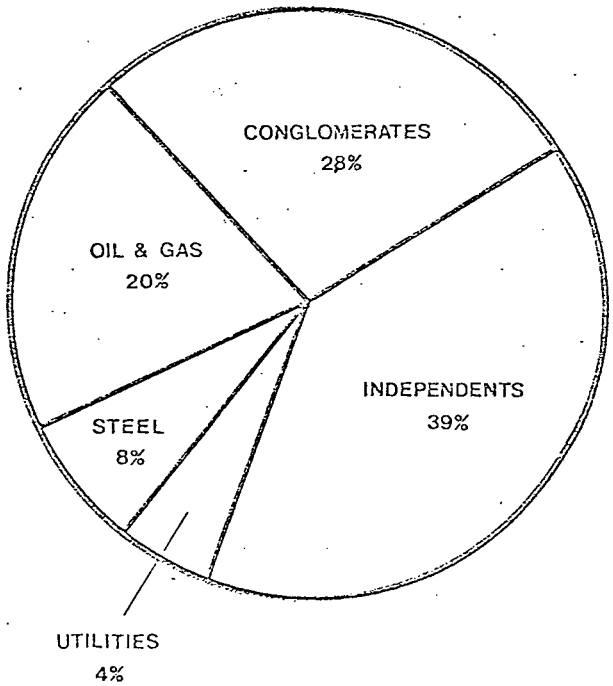
Is this monopoly behavior? Would this be restriction of output? The country's most efficient coal company is about to grow by 40 percent. Why should we worry about this in a time of scarce energy?

I can see granting aid to small firms entering the coal business, to encourage competition and output. But can we not encourage competition better by allowing all firms to enter the industry?

Is the supply of investment money for coal production infinitely elastic, or will forbidding oil companies to invest in coal restrict or delay the development of coal supplies? Will restricting investment raise the price of coal to the consumer? Shouldn't we be trying to promote development, by as many companies as want to enter the field, if we are to become more self-sufficient in energy?

These are the kind of questions we must answer. They must be answered precisely, in numerical terms, not by emotion or guesswork. I hope that this type of hearing will act as a catalyst to spur hard research into the structure of the energy industry and the numerical values of the relationships mentioned above. We must have this data if our decisions are to be informed ones. I hope we shall have such information available before we take legislative action in this area.

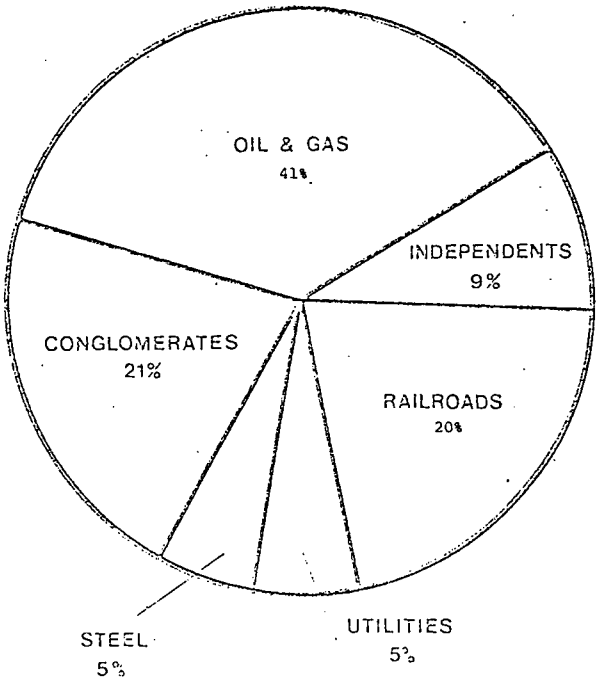
Control of Coal Production 1974



Source : Keystone coal industry manual.

Control of Future Coal Production

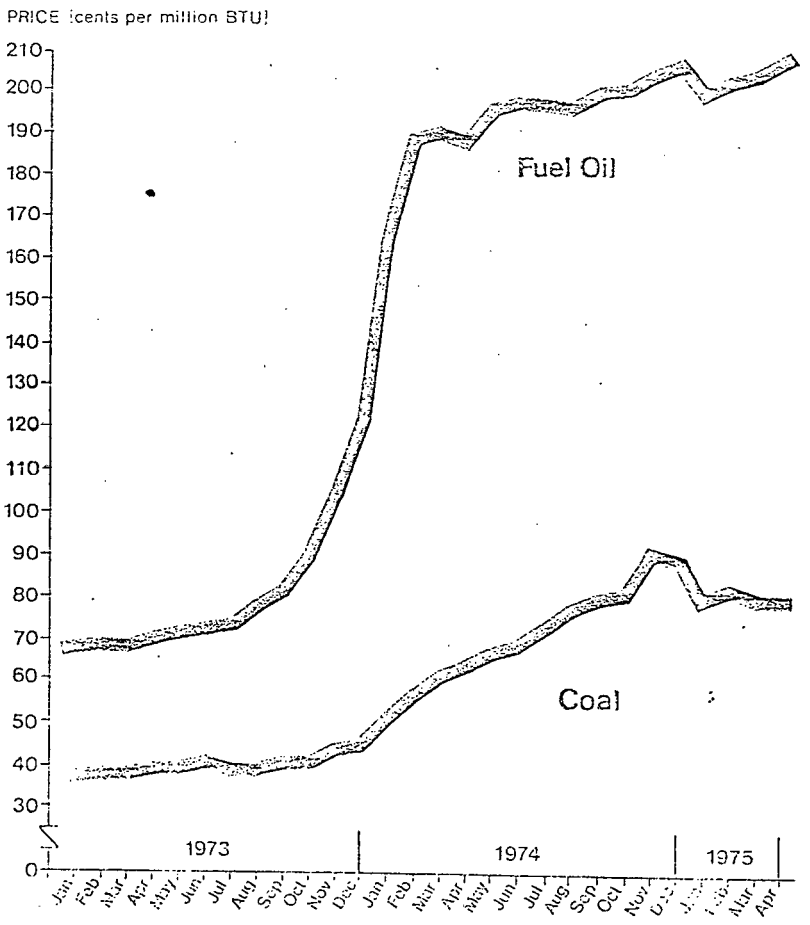
(Known Coal Reserve Ownership)



Source: Company annual report and forms 10–K. 1974 Keystone coal industry manual.

Delivered Price of Fuel Oil and Coal to Utilities

January 1975 to April 1975



Source: Federal Power Commission

Control of Coal Reserves by Industry Group

	Millions of tons
Oil and gas companies:	
Continental Oil Company	14,800
Exxon	7,000
Occidental Petroleum	4,430
Mobil Oil	3,000
Eastern Gas and Fuel	2,600
Gulf Oil	2,600
Atlantic Richfield	2,200
Sun Oil	2,200
Texaco	2,000
Kerr-McGee	1,500
Houston Natural Gas	1,000
Standard Oil of California	1,000
Shell Oil	1,000
Standard Oil of Ohio	850
Columbia Gas	360
Alco Standard	250
MAPCO	110
Total	46,900
Railroads:	
Burlington Northern	11,400
Union Pacific	10,000
Norfolk and Western	1,400
Southern Railway System	280
Chicago and North Western	30
Total	23,110
Conglomerates:	
Kennecott Copper	8,900
American Metal Climax (AMAX)	4,900
Pittston	1,500
Can Pac Minerals Ltd.	1,300
Utah International	1,300
Hillman Coal and Coke Co	1,000
General Dynamics Corporation	600
D. D. Stewart	600
Morrison-Knudsen	500
Reynolds Metals Co	350
Steams Coal and Lumber Company	300
Union Carbide Corporation	250
Gulf Resources and Chemican Corporation	203
Donan Joint Venture	200
McAllester Fuel Company	200
New Mexico and Arizona Land Company	200
Zapata Corporation	200
Great Northern Kekoosa Corporation	180
New Era Resources Inc	150
Allied Chemical Corporation	100
American Smelting & Refining Co	100
Mead Corporation	100
Total of those holding under 100 million tons	718
Total	23,851
Independent companies:	
North American Coal	5,400
Westmoreland Coal	1,200
Rochester & Pittsburgh Coal	300
Allegheny River Mining	200
Bane Coal Corporation	200
Kentucky River Coal	200

	Millions of tons
Independent companies—Continued:	
Palmer Coking Coal	200
Pinson Coal Company	200
Red Ash Pocahantas Coal	153
Neely & Gibson Coal Company	140
Carbon Fuel	100
Total of those holding under 100 million tons	1,646
Total	9,930
Utilities:	
Pacific Power & Light	2,500
American Electric Power	1,500
Montana Power	1,000
Southern Electric Generating	400
Duke Power	250
Public Service Company of New Mexico	160
Pennsylvania Power & Light Co	95
Allegheny Power Service Corporation	90
Public Service Company of Indiana	50
Total	6,045
Steel companies:	
U.S. Steel	3,000
Bethlehem Steel	1,800
Armco Steel	400
Jones & Laughlin Steel	200
Kaiser Steel	200
Total	5,600
Total known controlled reserves	115,436

Sources: Keystone coal industry manual, company annual, and 10–K reports; UMWA research department surveys.

PREPARED STATEMENT OF PAUL DAVIDSON, PROFESSOR OF ECONOMICS AND ASSOCIATE DIRECTOR OF THE BUREAU OF ECONOMIC RESEARCH AT RUTGERS—THE STATE UNIVERSITY OF NEW JERSEY

My name is Paul Davidson. I live at 18 Turner Court, Princeton, New Jersey. I received a Bachelor of Science degree from Brooklyn College in 1950, a Master of Business Administration degree from City College of New York in 1955 and a Ph. D. in Economics from the University of Pennsylvania in 1959. I was a member of the Economics Department of the Wharton School of Commerce and Finance of the University of Pennsylvania and taught there during the periods of 1955–1958 and 1961–1966. From 1958 to 1960 I was Assistant Professor of Economics at Rutgers University. In 1960–1961, I was Assistant Director of Economics Division of the Continental Oil Company. In 1964–65, I was visiting Lecturer and Fulbright Scholar at the University of Bristol in England. In 1970–71, I was a Senior Visitor at the Faculty of Economics and Politics of the University of Cambridge (England). I have held my current position at Rutgers since July 1966.

I am the author of a book entitled Theories of Aggregate Income Distribution (Rutgers University Press, 1960) and one entitled Money and the Real World (Macmillan, 1972). I have coauthored books entitled Aggregate Supply and Demand Analysis (Harper and Row, 1964), Milton Friedman's Monetary Framework (University of Chicago Press, 1975), and a monograph entitled Demand and Supply of Outdoor Recreation (Bureau of Outdoor Recreation, 1969). I am the author of numerous articles on various economic subjects which have been published in professional journals such as The American Economic Review, The Economic Journal, Oxford Economic Papers, Canadian Journal of Economics and

Political Science, Public Finance, Econometrica, Land Economics, The Southern Economic Journal, The Natural Resources Journal, Review of Economics and Statistics, The Journal of Political Economy, Economic Inquiry, and the Brookings Papers on Economic Activity.

My interest in the economic problems of the oil and gas industry can be traced back to 1960 when I was the Assistant Director of the Economic Division of the Continental Oil Company. Since then I have analyzed economic aspects of oil and gas in professional articles, in testimony as an expert witness before the Federal Power Commission and various congressional committees, as a member of the Supply-Technical Advisory Committee of the National Gas Survey, and in the past few years as a consultant to the Ford Foundation's Energy Policy Project where I was the senior investigator on a study entitled "The Relations of Economic Rent and Price Incentives to Oil and Gas Supply," and as a member of the Brookings Economic Panel where I was the senior investigator of a study entitled "Oil: Its Time Allocation and Project Independence."

These studies led me to conclude:

(1) In terms of ultimate supplies of indigenous fossil fuels there is no danger that the U.S. will be depleted in the next 100 years even if present demand trends continue. Moreover, Western Europe is likely to be nearly self-sufficient in fossil fuels in the early 1980's. The energy crisis, whatever else it may mean, does not mean that the age of cheap fossil fuels is over—at least, not in terms of cheap economic real costs of finding oil. Nor does it mean, on either a world-wide or North American basis—at least if history is a basis for judgment—that increases in current market prices are necessary to meet growing petroleum consumption demands. For example, during the years 1962 through 1972 (where until the very end of the period prices were not rising) world consumption of petroleum increased by 107.4% while world crude oil proved reserves increased by 108.5% during the same period.[1] In other words, the world was not facing any greater threat of running out of crude oil in 1972 than it was 1962. What had happened was that the North American proved reserves increased by only 18 percent from 40 to 47 billion barrels, while Middle Eastern reserves climed spectacularly from almost 200 billion to over 350 billion barrels. This modest rise in North American reserves vis-a-vis the Middle East should not be interpreted as meaning that this continent is "running out" of oil. During this period, all rational producers who could afford it preferred to invest their time and money to find cheap reserves in the Middle East (10 to 50 cents per barrel) rather than more expensive reserves in North America (\$2 to \$4 a barrel).

Of course as long as the U.S. market was partly insulated from cheap foreign oil by import quotas, and the domestic well-head price was supported at a profitable level by state prorationing regulations and the federal Connally Hot Oil Act, there was still a profit incentive to continue to find some additional U.S. reserves to meet the growing U.S. demands, and reserves did increase during the period; but it was the explosive growth in demand by Western Europe and Japan together with the apparent cornucopia of cheap Middle East oil that led to a drastic reallocation of investment by oil companies from North America to the Middle East and elsewhere.

(2) The energy question, of course, is merely at what price are American consumers going to get all their energy needs filled. Neither the oil industry spokesman nor academics will deny there is plenty of domestic energy as well as foreign energy sources; the question is the price. My Brookings study attempted to estimate this price. We found that Project Independence could be achieved at a price of \$5–\$7 per barrel (in 1974 dollars) by 1980 if certain governmental policies were to be adopted. These policies would be designed to restore the degree of competition which existed in the U.S. oil industry in 1971[2] and make speculative withholdings of current production of oil and other fuels unprofitable.

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[1] See M. H. Jacoby, Multinational Oil (Macmillan, New York) 1974, pp. 55, 69.

[2] Our Brookings study suggests that the degree of monopoly was substantially higher in 1974 in the domestic oil producing industry than it was in 1971 (and it would have been even higher without regulation of old oil prices). The Brookings study indicated that if a purely competitive market for oil could be established by 1980, the price of oil under Project Independence would be in the \$4 to \$6 range. (This latter estimated should be considered merely a theoretical benchmark, for it is highly unlikely that a purely competitive market environment could be established by 1980, no matter how vigorous antitrust legislation and judicial action was during the interim.)

PROPOSAL FOR A NATIONAL ENERGY POLICY (NEP)

The sudden quadrupling of the world crude oil price during the 1973–74 period is at least partly responsible for the severity of the current world wide recession and economic dislocations. Moreover, OPEC's future crude oil price policies will remain a serious threat to the survival of the world's monetary relations during the next few years.

In this section I proposed to outline a nine point National Energy Policy (NEP) for the United States which will have both short run and longer run implications.[3]

In the short run we should not undertake policies which are likely to exacerbate the current problems of unemployment and inflation.[4] In the longer run, our policies should be oriented towards breaking up the OPEC cartel and the growing monopolistic control of domestic energy sources.

A nine-point National Energy Policy (NEP) which could provide U.S. consumers with sufficient energy while allowing producers to earn a competitive return rather than permitting them to share in cartel profits would include: (1) extensive antitrust action to break up conglomerate energy companies and to create competitive alternative sources of energy (competitive to OPEC sources and the major oil and gas producers), (2) governmental coordination and regulation of wellhead prices of oil and natural gas so that any necessary price increases occur at such low annual rates as to make speculative withholding unprofitable (and in no case should wellhead price of oil and gas be suddenly decontrolled), (3) prohibitive capital gains taxes on oil and gas properties to catch any speculative profits which avoid other policy nets, (4) the changing of leasing policies on federal properties in order to reduce the financial constraint of the front-loaded bonuses and permit independents to develop offshore properties, (5) policies which encourage and require accelerated exploitation of old and new properties, even if in certain situations such policies were to encourage flows in excess of MER, (6) policies which prohibit the "shut-ins" and other practices which permit speculative withholding,[5] (7) an announced increasing schedule of import taxes on foreign crude oil and products over the next three or four years. Such an import tax schedule must be phased in with growing U.S. production while U.S. wellhead prices are controlled as suggested in (2) above, (8) a federal sponsored corporation which at a minimum would aid in financing the development of new properties and might even enter into joint ventures with independents; in other words, a Federal oil and Gas Corporation (FOGCO); (9) the adoption of the Hart-Church bill (S. 1430) for an import auctioning system with unidentifiable foreign sellers to supply the diminishing share of the U.S. market as we approach self-sufficiency in the next few years is desirable. Such a program will create a positive incentive for members of OPEC to break with the cartel.

If, on the other hand, the government permits an unregulated market price for oil without altering existing market institutions and conditions, the 1980 domestic wellhead price for crude oil could easily be higher than the $11 per barrel that the government's Project Independence forecasts as domestic oil prices will in essence be set by the Sheiks on the Persian Gulf; I see no reason to believe that the OPEC cartel will necessarily unravel of its own accord. The OPEC nations are engaged in an economic war with the major consuming nations over the distribution of the world's wealth. Existing economic and political conditions in consuming nations such as the U.S. have made the OPEC cartel's job of preventing price cutting competition from alternative sources easier. Until the consuming nations recognize that the dispute underlying this economic warfare can only be negoti-

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[3] The following sections of this statement will spell out the rationale as well as provide some supporting data for this NEP package.

[4] The Nobel Prize winning economist, Sir John Hicks, has suggested that the reason the U.S. has not experienced the same higher rates of inflation of Western Europe in the last two years is due to the fact that the price-rise of imported oil, "while it has a large effect on the American import price index, has not been allowed to soak through to the domestic American economy. The American oil producers have not been allowed to raise their prices. . . ." [J. R. Hicks. "What's wrong with Monetarism", Lloyds Bank Review, October. 1975. p. 12]. (For a further discussion of this aspect, see the section below entitled "Energy Policy and the Problems of Inflation and Recession.")

[5] According to the Wall Street Journal, Dr. Walter Measday reported on a study to the Senate Subcommittee on Antitrust and Monopoly that "Louisiana offshore oil leases controlled by a 'handful' of companies potentially could produce nearly twice as much as they currently do."

ated from a position of internal strength, the consuming countries will remain at the mercy of the producing nations and domestic conglomerates and royalty owners who have a vested interest in redistributing wealth from consumers to producers and property owners.

Sole reliance on either a large gasoline tax, or a simultaneous tax on imported and domestic oil (or even restrictive import quotas and rationing) or simply higher domestic prices to reduce U.S. consumption simply to lower the world oil price when there is neither a Malthusian shortage nor an Arab embargo is unwise. Such a policy assumes that merely by driving up the price to the consumer in order to reduce the quantity demanded of imported oil (but without altering the price inelasticity of demand), the cartel will break as the result of Arab squabbling over the spoils extorted from the consuming nations. Since such a policy does not directly change the demand curve of OPEC oil (except perhaps in the "long run" when we will all be dead), it merely requires consumers to move along a short run price inelastic demand curve; its potential for success due to economic forces is very low.

From the economist's viewpoint, a more certain way of breaking the cartel is to alter the demand curve for imported oil, that is to create conditions which all recognize cause the demand for OPEC oil to become price elastic in the relevant range in the near future. Such a price elastic demand will occur when there are potentially significant quantities of alternative sources of energy available which are (1) profitable to produce at less than the cartel price and (2) whose production rates are not controlled by managers who have a vested interest—and by their own actions can force the market price to the same level as the cartel price.

Domestic oil is, however, under production control of companies who have a vested interest in maintaining the current world monopoly price in fossil fuels. Deregulation of wellhead prices therefore is not likely to create incentives for domestic producers to undersell the cartel even though they could make more than a competitive rate of return by doing so (as long as they can legally make a higher return by sharing the monopoly position of the cartel). Accordingly, intelligent coordination and regulation of domestic wellhead prices [6] by the federal government is a necessary condition if we are to break the OPEC cartel.[7]

OPEC price can be brought down by fostering increased domestic production by producers who have no legal way of maintaining world oil prices in the U.S., who operate under laws which make it unprofitable to speculate by withholding while simultaneously creating incentives for increasing current production and who can make a fair, profit by selling domestic oil at prices which are significantly below OPEC prices. Specifically the availability of additional domestic production of crude oil at profitable but controlled wellhead prices well below the OPEC cartel level will create an elastic demand for OPEC oil and hence aid in the reduction of world oil prices.

Immediate and sudden deregulation, or even phased deregulation, over the next few years which permits the wellhead price to rise at a rate which exceeds the rate of interest will have economically devastating effects. Such phased deregulation, for example, would merely create an additional incentive for producers to limit current production since a barrel of oil left in the ground would be earning more in future profits than any other investment. Immediate deregulation would permit producers to immediately raise domestic prices to the extortion levels set by the OPEC cartel, and thereby legalize the potentially monopolistic capitalized value of their underground "old oil" reserves. This in turn would induce highly inflationary effects in the U.S. economy.

For the consumer of energy it will mean still higher costs of energy in a world where the real costs of producing these fuels are low. Income and wealth would be redistributed as consumers are required to pay monopolistic prices which produce windfall profits for producers and royalty owners when the world market price is set by the cartel. To suddenly decontrol wellhead prices of "old" oil would provide U.S. producers with a license to join the extortion game currently being foisted on consumers by the OPEC cartel, as the U.S. prices would not be set by "free competitive market forces."

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[6] Intelligent regulation does not mean wellhead prices can never increase. Some proposals which are labelled "deregulation," e.g., permitting wellhead prices to rise by less than the annual rate of interest may, in certain circumstances, be a very intelligent form of coordination and regulation.

[7] The OPEC cartel has the multinational companies to coordinate their price-market sharing agreements. (See M. A. Adelman's "The Oil Crisis—One Year Later" address given to the Conference Board on November 21, 1974.) What the U.S. needs is a coordinated government energy policy to break the cartel and their willing industry supplicants.

Saudi Arabia has taken over the role in the world that the Texas Railroad Commission and Texas producers played in earlier years in supporting domestic prices above real costs of production. As long as the Saudis maintain that role, unregulated prices in the U.S. will not readily come down towards the real costs of production (including a competitive return on investment) until we are not only self-sufficient but are faced with domestic surfeits and freedom from demand prorationing controls enforced by either state governments or by large producers. Thus, to decontrol wellhead prices will merely exacerbate the redistribution of income and wealth from consumers to producers and property owners which is currently underway in the U.S. and in the world.

But perhaps even more importantly, to permit U.S. wellhead prices to find the level of the cartel-set world price would so aggravate our present inflationary problems as to risk economic disaster.

WHY ENERGY PRODUCTION CAN'T BE LEFT TO EXISTING "FREE" MARKET DECISIONS

The primary objective of any rational energy policy must be to reverse and hopefully eliminate the recent growth of monopoly power in the international and domestic energy producing industries for it is this growth of monopoly power and not a Malthusian shortage of resources that has created the energy crisis for the consuming nations. Elimination of the power of the OPEC cartel and its ramifications on the domestic energy industry will once again permit consumers to obtain abundant energy fuels at lower prices—prices that are closer to the real costs of production including a fair return on investment.

Since for any particular property the fossil fuels in the ground are a fixed inventory (or exhaustible resource)—the more used today, the less will be available for future delivery. Consequently, a rational oil producer will compare the expected profits of selling a barrel of oil today with the expected profit (properly discounted) of selling that same barrel at some future date. Thus, if producers expect the difference between wellhead prices and cost of production to increase (at an annual rate which exceeds the rate of discount) in the future, there is an incentive to reduce current production and hold it in underground inventories; while, if expected future profits are less than current, there is an incentive to produce more now. This phenomena of comparing discounted future profits vis-a-vis current profits in determining the rate of exploitation of fossil fuel properties by producers has been developed in the economic literature via the analyses of user costs.[8] Economists say user costs are positive and there will be a deceleration of current production when the expected difference between future prices and costs (properly discounted) has increased. When user costs are negative, the expectations of future prices relative to costs lead to an accelerated exploitation of the property.

Thus, in a world where the future is uncertain with producers "free" to make any production decisions they think most profitable, we are left with a bootstrap theory of the time rate of exploitation of fossil fuel bearing properties; current expectations of producers about future prices relative to costs play the pivotal role. Accordingly, relative stability over time in prices and production of energy resources requires that most producers believe that tomorrow will not be significantly different from the recent past, although the market can perhaps accommodate some divergency of views among producers as long as on average producers expect stability.

Competition in such markets will provide intertemporal stability of prices and production flows only if the views of the competitors either coalesce in the belief that the future will not be significantly different from the recent past, or the views of the competitors differ as to whether user costs are positive and negative in such a way that the "average" view is that user costs are zero. If, even with competition, most producers expect a significant change in prices relative to costs in the future, the current rate of exploitation will be accelerated (i.e., if user costs are, on average, negative) or retarded (if "average" user costs are positive). Thus in the 1930's the discovery of the huge East Texas fields touched off expectations of large negative user costs (i.e., expectations of wellhead price declines) in an industry that at that time was relatively competitive at the wellhead stage. The result was a disastrously rapid rate of exploitation of domestic oil fields

[8] For a complete discussion of user costs and petroleum production, see Paul Davidson, "Public Policy Problems of the Domestic Crude Oil Industry," American Economic Review, Vol. 53 (March 1963), pp. 85–108; also see Robert G. Kuller and Ronald G. Cummings, "An Economic Model of Production and Investment for Petroleum Reservoirs," American Economic Review, vol. 64 (March 1974), pp. 66–79.

which brought about the fulfillment of the expectations of rapidly declining wellhead prices relative to costs. (The moral of this historical episode is that expectations of rapidly changing prices relative to costs in this industry can encourage behavior which will make the prophesy self-fulfilling, if the expectations are widely held and not readily altered.) Market prorationing supported by the 1935 federal Conally Hot Oil Act was required to alter these negative user cost expectations of competitive producers and stabilize the domestic industry. In later years as foreign oil became important in world supplies, the operation of import quotas plus market prorationing effectively eliminated any strong positive user cost expectations by domestic producers. At the same time user cost speculation in the international market was restrained by the ability of the "Seven Sisters" to maintain an orderly market.

Most sellers of energy resources have, however, been led to expect rapidly rising prices by the events of the early seventies—including the relaxation of market-demand prorationing, the growth of the power of the oil cartel, the Organization of Petroleum Exporting Countries (OPEC) at the same time that import quotas were being removed, and the unsettled politics of the Middle East. These events have stimulated speculative proclivities and consequently retarded current production of fossil fuels and other energy sources such as uranium.

Current events have created an environment where most domestic energy producers and property owners expected rapidly rising wellhead prices of natural gas, old crude oil, coal (as conglomerates "require" equal returns from each division), and even "new" crude as OPEC turns the cartel screw a little tighter and tries to "catch-up" to some extent on the world inflationary forces that the cartel released in the recent past, and the Administration talks about removing all controls from wellhead prices. Currently regulated wellhead prices in the U.S. are below what the market could be forced to pay (i.e., demand is in the price inelastic range) while competitive fuels are controlled by growing monopolies (e.g., OPEC) and separate but not independent divisions of the same "energy companies." The Congress and F.P.C. specifically hold public hearings to determine whether the wellhead price should be increased or even decontrolled. All these factors encourage producers to expect, at worse, no change in the existing price; and at best, a substantial increase. In other words, producer expectations are biased in the direction of price increases as monopolistic control of supply is validated by events and governmental policies—and hence speculative expectations can have a significant impact on diminishing current supply offerings.

John Maynard Keynes once pointed out that economic progress depended on the spirit of Enterprise, which in this context refers to the activity of producers motivated by a desire for action rather than inaction and operating under reasonably stable conditions in an uncertain world, to produce a steady flow of output for the economy. Keynes recognized that in an uncertain world some men's proclivities would always turn to the possibility of making speculative profits via supply manipulations, and he noted "Speculators may do no harm as bubbles on a steady stream of Enterprise. But the position is serious when Enterprise becomes the bubble on a whirlpool of Speculation." The critical current supply situation for natural gas and oil in the U.S. and the cartelized supply of all fossil fuels in the world is in part due to Enterprise becoming engulfed in Speculative as well as Monopolistic practices.

GROWING MONOPOLY POWER AND SPECULATIVE SUCCESSES REINFORCE EACH OTHER

In the current energy crisis two major processes have occurred concurrently and these have exacerbated the speculative excesses of the energy market. These processes are (a) the growth of monopoly power of the OPEC cartel and (b) the development of conglomerate multinational energy companies who control substantial quantities of substitute domestic energy supplies.

The impact of the OPEC cartel in recent years is obvious and I need not pursue it at this point. Instead, I shall dwell a few moments on how the growth of conglomerate energy companies has reinforced the ability of the OPEC cartel to raise prices and to create positive user costs in recent years.

The existence of an exploitable monopoly position depends on the present and future price elasticity of demand in the revelant price range. As far as the OPEC cartel is concerned, therefore, it depends in large measure on the current price in consuming countries and ultimately on the supply price at which alternative sources of energy will become significant substitutes for OPEC oil. Suppose, however, the supplier of a substitute energy source also has an economic interest in OPEC petroleum reserves because it is a conglomerate energy com-

pany with an OPEC concession or other large oil reserves. Then it will anticipate a positive user cost in providing the substitute if production of this substitute reduces potential profits from its oil reserves. This positive user cost will raise the supply price (above resource costs) or marketing the substitute.

In these circumstances this positive user cost of substitutes internalizes a cost that in a competitive economy would be external to an independent producer of a substitute energy source. Independent producers of domestic oil, shale, tar sands, coal, uranium, and so on (provided they were not permitted to share the monopoly returns of the major energy companies), would not care if they inflicted capital losses on the value of foreign underground reserves of petroleum by providing a cheaper energy source. Most reasonable people would argue that society is the beneficiary of a decision to produce a less expensive substitute even though the oil producers and property owners would suffer a capital loss. The existence of rational, multisource, energy-producing conglomerates, however, constrains production of substitute fuels, makes monopolistic control of energy markets easier, and reduces consumer welfare. The ability of conglomerates to maintain high prices for the substitutes tends to reinforce their monopoly power in marketing their OPEC oil.

If at the current price consumer demand for OPEC oil is therefore still in the exploitable range, a strong cartel of oil-producing nations can allow multinational energy conglomerates to continue to raise prices relative to real resource costs. The continuous revenue increases of host nations since 1970 seem to be attempts to search out the point at which demand for OPEC oil becomes so elastic that monopoly rents are fully exploited. (However, for any given demand situation with any degree of elasticity, higher prices require production restrictions, and hence at least tacit market-sharing arrangements to prevent one member of the cartel from increasing its gains at the expense of others.) Since the multinational energy companies also have vested interests in the price of OPEC reserves as long as they retain any monopoly rents, they will be willing tools in maintaining an "orderly" production market in all fossil fuels. Thus monopolistic and speculative withholding reinforce each other and merge into one.

SOME SPECIFICS ON A NEP

Hence a NEP must be aimed at: (1) creating an elastic demand for imported oil via encouraging the existence of many independent domestic producers of energy who cannot share in the monopoly rents of OPEC and the Seven Sisters, (2) squelching producer speculation activities in all energy sources, and (3) creating incentives for individual OPEC members to cheat on the cartel by removing the international energy companies as a mechanism for enforcing OPEC price decisions.

Stopping Speculation

Speculation can be squelched in either of two ways: (*a*) adoption of a regulated wellhead price policy which creates an atmosphere of certainty that any future price increases relative to production costs will be at an annual rate so small as to be below annual carrying costs so that it will never pay to speculate on inventories, (e.g., ceiling prices will never increase by more than six percent per annum) ; or (*b*) creation of conditions which make expectations of a future price decline just as likely as an increase, so that individual's speculative expectations tend to cancel. Bluntly, in the current context, this means permitting those who have withheld production in order to profit by it should be so well rewarded by the "free" market that it would appear to many that the consumers no longer have sufficient wealth or income to leave them open to further extortion.

Many people, including President Ford's advisers, believe that decontrolling natural gas and "old" oil wellhead prices would be sufficient to establish the condition (b) above. In present circumstances, however, even decontrol with wellhead prices rising to current cartel levels may not be sufficient to create condition (b).

In the first place history is replete with episodes where "free" or uncontrolled commodity markets have been subjected to disruptive speculative withholdings.[9]

[9] Even today, the case of the "Centre Point" office blocks the corner of Tottenham Court Road and Oxford Street in London is a case in point. Although it was built in the early '60's and although there has been an acute office space shortage in central London, this building has remained unoccupied. The developer discovered that because of the space shortage, the price per square foot is rising faster each year and the capitalized value of the unused building increases by more than the building would if the space was leased out on long term supply contracts. Thus, the shortage problem is exacerbated by a free market and the right to speculate by withholding.

Given that control of significant quantities of alternative fossil fuels are either in the hands of foreign nations or other divisions of the same domestic "energy companies" who are the major producers of oil and natural gas, it may be difficult to create condition (b) as consumers could be continually whipsawed by price rises [10] in the alternative fossil fuel markets until multinational conglomerate energy producers and OPEC nations believe they have extracted the maximum transfer of income and wealth they can from the impoverished U.S. energy consumers. Even if it were possible, however, condition (b) would probably require, in present circumstances, an immediate and substantial rise in wellhead prices—high enough to convince a sufficient number of producers that the new price *exceeded* the long run price that the market could bear so that further price movements were more likely to be in a downward direction.

Such a price increase would create tremendous economic rents for producers and landowners (which violates any reasonable fairness criterion). It would in essence formally legitimize the existing monopoly control of fossil fuel markets, and it would contribute to our inflationary problem by creating conditions where individual groups of workers and other industries would try to catch up, that is, to re-establish the pre-"energy crisis" purchasing power of their incomes by demanding wage and price increases to offset higher energy prices. Even if it were possible to decontrol old oil and natural gas, it would be socially and politically undesirable. Accordingly, we are left with condition (a); to design a policy of regulating the wellhead price in such a way as to eliminate speculation as a factor affecting supply offerings. This will require: (4) regulation of wellhead prices of oil and gas in such a manner as to permit prices to rise relative to costs at an annual rate, which is less than the rate of interest only if such increases are necessary to permit producer to earn a "fair rate of return" and property owners a "fair" payment.

Federal Leasing Policy.—A change in the lease contract from the constant percentage royalty and front loaded bonus would reduce the financial constraints and aid the independent producers in the development of new properties on the Outer Continental Shelf. For example, a bonus-variable royalty system under which the total bonus plus accrued interest would be paid on a schedule of annual payments out of sales receipts after the property was on-stream would virtually eliminate the producers' flow of funds problem for financing leases and would substantially reduce the total financing problem of exploration and development (E & D) costs.

Lease bonus costs are a substantial portion of E & D. Data provided in a recent FPC Opinion [11] indicates that for the nation as a whole, ⅓ of total E & D costs for successful non associated gas properties are lease acquisition costs. If dry hold costs are included in the calculations, the figure is approximately ⅕ of total E & D costs.

Similar information was not readily available for oil properties. By making Oil,[12] I estimate that lease bonuses in 1972 vary from a low of 25% to a high of some reasonable assumptions and using statistics provided by USGS and World 65% of total E & D for offshore oil properties. Accordingly, I would think that a rough estimate of between ¼ to ⅓ is representative for all oil and gas properties in the U.S.

In absolute terms, recent lease bonus sums are staggering. In 1972 federal offshore lease bonus receipts totaled $2.25 billion.[13] Offshore acreage which received bonuses of a few hundred dollars per acre in the 1950's now receive bonuses as high as $20,000 per acre and more. These costs are so substantial that very few producers below the top 16 largest have obtained leases independently and even these "majors" must normally enter into joint ventures. For example, in

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[10] The argument that price should be based on the real value of a good where value is determined by the highest-cost alternative is a familiar ploy used by many groups in making special pleas for improving their own income. For example, natural gas and "old" oil is "artificially" cheap relative to the (cartel set) "free" market price of oil. The argument is going to be perpetuated in the energy market as long as monopoly power remains. For example, Fortune magazine (May 1975, p. 274) indicates that OPEC has hired a prestigious American "think tank" to provide a computer model which will "determine" the 'real value" of crude oil through the year 1990 on the basis of the price of available alternatives rather than on the costs of production. Caveat emptor!

[11] FPC Opinion No. 699, June 21, 1974, appendix C.

[12] USGS, Outer Continental Shelf Statistics (June 1974) p. 20; World Oil, Feb. 15, 1974, p. 86.

[13] For some individual auctions the data are: Dec. 20, 1973 (87 tracts) $1.5 billion; June 19, 1973 (100 tracts) $1.6 billion; Dec. 19, 1972 (116 tracts) $1.7 billion; Sept. 12, 1972 (62 tracts) $586 million.

testimony before the House Subcommittee on Activities of Regulatory Agencies,[14] FPC economist David S. Schwartz provided substantial evidence of how the high lease bonuses effectively prohibit independents from obtaining offshore leases. Schwartz showed:

1. Only 4 of the 16 major petroleum companies with an interest in Federal offshore properties own 50% or more of their producing leases independently,
2. 10 of the 16 own 80% or more of their offshore leases jointly with one another.
3. major banks have representatives serving as directors on two or more petroleum companies.[15] Moreover, the FTC and the Justice Department are investigating several cases where individuals are serving on two or more boards of directors of petroleum companies,
4. in recent offshore federal leases sales, the top 8 firms in each auction paid between 72% and 96% of all lease bonuses.

Such evidence strongly suggests that "old" supplies of oil and gas, and even more significantly "new" supplies of oil and gas (which many are advocating should be decontrolled and never regulated), are concentrated in the hands of a small, tightly knit oligopoly—perhaps even tighter for new supplies than for old. The members of this oligopoly can not be expected to vigorously compete with each other since they are joint partners in numerous properties. Moreover, this domestic cartel could view its most profitable course as being complimentary to the OPEC cartel.

It is imperative, therefore, to encourage new entrants into the leasing and developing of offshore properties. In my view this will probably require not only the removal of the front-load bonus, but also the formation of a FOGCO to aid in financing exploration and development of offshore properties by independents primarily via joint ventures.[16]

Lease Bonuses and the Federal Budget.—Lease bonuses have, in the last few years, brought substantial revenues into the federal Treasury. Removal of the front-load bonus will result in the postponement of these revenues for a number of years. Consequently the immediate impact would be to increase the federal cash flow deficit. Moreover, if a FOGCO was formed to aid in the cost of E & D by entering into joint ventures with the independents, the immediate impact would be to increase the government's cash deficit even more in the next few years.

Nevertheless, the removal of the front-load bonus and the creation of FOGCO can be readily justified by looking upon these actions as (a) productive investments which will provide our government with a fair rate of return over the long run while significantly providing consumers of energy with lower priced fossil fuels, and/or (b) a part of the defense budget for offensive weapons which will help the U.S. negotiate a more favorable peace settlement in the economic war that the OPEC cartel has declared on the consuming nations.

AN IMPORT AUCTION SCHEME

To help achieve the intermediate range goals of breaking the OPEC cartel with the desirable attendant reduction in Arab-country power over Western Europe and the Third World, I would argue for elimination of the major international oil companies as direct importers of OPEC crude for the U.S. The OPEC cartel has not yet broken down, as a cartel usually will (because of its members cheating on price), for two important reasons: 1) the solidarity among the Arab producers, and 2) because the international companies willingly police prices and quantities in non-Arab OPEC countries. To act differently would threaten their Arab oil concessions. For example, Aramco, the sole producer in Saudi Arabia is a combination of four of the "Seven Sisters." These four companies cannot purchase large quantities of crude over long periods at prices well below OPEC levels from sources outside Saudi Arabia, or else they will be in serious

[14] Testimony dated Mar. 26, 1974.

[15] This raises the issue as to whether independent producers could readily obtain finance from banks who have interests in majors who might be adversely affected by the competition.

[16] One significant side advantage of FOGCO joint ventures is that the Federal Government would get reliable information on reserves, probably for the first time. Economist Schwartz, in his testimony, provides an example—which would be amusing if it were not so serious. Using data in FPC certification applications, Schwartz showed that for a given period in Southern Louisiana 6 applications for certification showed the "discovery" of 4.3 trillion c.f. of reserves on those properties alone while AGA gross reserve additions for all Southern Louisiana was reported as less than one trillion cubic feet in the same period.

danger of losing their control of more than six million bbls. per day of crude production in Saudi Arabia.

The establishment of a federal agency as the sole purchaser of imported crude and petroleum products via a secret auction system would eliminate the price surveillance mechanism of the internationals which is a strong prop holding the OPEC cartel together. This federal agency should not be limited to making a zero profit or loss in each year. The agency should be able to, at any point of time, refuse any or all sealed bids as part of a strategy to prevent collusive bidding arrangements; hence, the agency may not be able to purchase sufficient oil to cover the difference between domestic demand and supply for any one period. If the agency was forced to sell this limited quantity of imports at a zero profit price, and if there was no domestic price controls, the refining companies could make a windfall profit because of the shortage. Moreover, for reasons given below, there may be circumstances where it may be strategic for the agency to operate at a loss.

The bidding duration of purchase contracts should have a built-in flexibility which encourages sellers to price at less than the cartel price so that the greater the discount offered from the cartel price, the longer the purchase agreement. For example, suppose all bids submitted are at the world cartel price. The agency should be required to limit purchases to 60 or 90 days (and perhaps even reduce imports) and request another auction. If sellers are willing to undercut the world price, the purchase contract should have a longer duration. For example, if the seller's dollar price is 5% below world price, a 4 month contract for a specified quantity per month would be accepted; if the discount is 10%, a year contract; if 15%, a two year contract; etc. Such a duration-discount schedule may be extended to as long as four or five year purchases for substantial discounts. This will increase incentives to cheat on the cartel if the U.S. will guarantee quantity purchases at below current cartel prices for a number of years; especially if a cartel member thinks that this may mean a guaranteed market in later years at a dollar price above the world price when the cartel disintegrates. The objective is to make it so lucrative for any one member of OPEC to cheat and guarantee his income for a number of years that each member is uncertain as to who will be the first to break; while those with the greatest reserves have the most to lose if others break first.

Of course, if the agency is successful in breaking the cartel, it will be saddled with purchase contracts for specified quantities for a number of years which may be at a price above the market price. The agency should then sell the oil to domestic refiners at the world price thereby passing the gain on to the American consumer, and the loss of the agency should be subsidized from tax revenues. These agency losses can be looked upon as a defense expenditure for economic warfare, and a successful expenditure at that!

ENERGY POLICY AND THE PROBLEMS OF INFLATION AND RECESSION

There have been two main ways by which the rapid increase in energy prices have affected the recent U.S. inflationary and recessionary problems. Moreover, the energy sector will continue to exacerbate these problems in the future until the relations are properly understood and positive action undertaken to offset the energy sector impact.

In the first place, the exceedingly large increase in the cost of OPEC oil has led to an enormous transfer of purchasing power and real income from the residents of the U.S. (and other consuming nations) to the OPEC nations. Since the latter cannot or do not wish to spend most of their increasing claims on the purchase of newly produced U.S. goods (in economic jargon, the marginal propensity to save of OPEC nations is very high vis-a-vis American income recipients) even if the U.S. had not adopted restrictive anti-inflationary monetary and fiscal policies, there would have been, ceteris paribus, a reduction in aggregate demand. To the extent that the OPEC nations are willing to hold financial claims and not buy U.S. goods with the wealth that the cartel has extorted from U.S. consumers, the loss in U.S. real income due to redistribution will take the form of higher unemployment rather than a transfer of real goods. Since the cartel does not want real goods, the U.S. could, if we wished, maintain a higher current standard of living by enacting vigorous expansionary monetary and fiscal policies to offset the recessionary savings of OPEC.

Secondly, any increase in OPEC and domestic oil prices (and other commodities to a lesser extent) creates what in the 1920's was called a Commodity In-

flation. A Commodity Inflation must not be allowed to spill over into an income inflation[17] since the former can, with proper policies, be reversed; but the latter (i.e., a wage and profit margin inflation) is almost inevitably irreversible.

Inflation is a device for redistributing income. A commodity inflation will, as long as it lasts, redistribute real income from consumers of commodities to producers and owners of property from which the commodity comes. The world and domestic oil price inflation is a symptom of the real income redistribution that has occurred from energy consumers to the OPEC nations, multinational companies and domestic producers and property owners. The major impetus for this redistribution was the growing power of the OPEC cartel supported in large part by the lack of countervailing efforts in recent years by the multinational oil companies, the U.S. State Department, and the federal and state governments.

The American people must ultimately be told the inevitable economic realities of the recent world oil price rise, namely that there has been some reduction in the available total real income of the U.S.[18] and a considerable reduction of the real income of U.S. energy consumers. Until and unless we break the cartel, the only question which our society can control is how we divide the burden of this lower real income among members of the U.S. economy. But each group of workers and energy using industries will refuse to accept a fair share of the lower standard of living which this income loss entails. Instead each group tries to maintain the former purchasing power of its income share by raising its wages or prices and thus push the burden of the loss on others. These uncoordinated, inconsistent and competing claims for higher money income to offset higher commodity prices results in a rampant wage-price spiral, i.e., an incomes inflation that puts us all on a treadmill where we must all run faster—demand more money income—merely to try to catch up. But since there is less goods and services to go around, all oil consumers cannot all catch-up to their pre-Commodity inflation shares of the National Product.

The traditional remedy for an incomes inflation is sufficient stringency in monetary and fiscal policies ("bullet-biting") so that the economy becomes so impoverished that it cannot be held for economic blackmail by powerful subgroups in the economy who take action to maintain or improve their well-being at costs to others in society.[19]

The high levels of inflation and unemployment that we experienced in 1974 and 1975 are in large measure the result of (i) free market forces attempting to distribute the loss in real income (due to the 1973–74 cartel oil price rise) to the economically weak sectors of the U.S. economy, and (ii) deliberate Administration policies to at least nibble on, if not bite, the bullet. We are still witnessing the economic ripples of the OPEC extortion which has severely lowered the real wealth and income of our cities, our public sector employees, our last-in first-out members of the labor force, and particular vulnerable energy using industries. Nevertheless this continuing economic loss (as long as the cartel remains) has been absorbed by our economy with, all things considered, amazing resiliency.

Economic forecasters see a slow (perhaps too slow) recovery as long as there are no further devastating price shocks by oil producers or other powerful economic groups attempting further increases in their income via extortionary price increases.

Unfortunately both the Ford Energy Policy (which is ultimately oriented towards a further redistribution of income and wealth from energy consumers to energy producers and royalty owners) and the OPEC strategy of regaining some of the extorted real income it lost due to the inflation of consuming countries' price levels will inevitably reaggravate the inflationary and recessionary problems of the U.S. economy.

The remedy for our enlightened society which is faced with a redistribution of income towards foreign nations and domestic producers and royalty owners is not to adopt the free market philosophy of the "survival of the fittest" race to

[17] See J. M. Keynes, "A Treatise on Money" (Macmillan, 1930), vol. 1, pp. 155–6 for an early discussion of this process. See P. Davidson, "Money and the Real World" (Macmillan, 1972) pp. 338–57 for a more up-to-date interpretation of this inflation process.

[18] The loss in real income could have been reduced, however, had the U.S. Government recognized in 1970 that OPEC was engaged in economic warfare with the consuming countries.

[19] In essence each subgroup will attempt to emulate the Arab Sheiks and obtain and protect as much wealth for themselves as possible. Many economists in the U.S. are willing to force groups in our own country to bite-the-bullet, to accept economic impoverishment to fight inflation, but are strangely silent about encouraging bullet-biting remedies on the Sheiks of the Persian Gulf.

push the loss of real income onto others in our society. Instead, we should attempt to break the cartel and stop the redistribution via a coordinated national energy policy similar to the one I suggest above. To the extent that we must accept some of the already accomplished redistribution and potential future redistribution until the cartel is broken, an enlightened society should adopt a national policy for coordinating the income claims of various groups and equitably sharing the remaining output that would be available at full employment. Such a policy goes under various euphemisms such as "a social contract," or an "incomes policy" or even "wage and price regulation and coordination," i.e., "controls." In my view such a National Policy to Coordinate Income Claims (NPCIC) is the only viable alternative to the Darwinism of free markets where economic power is not equitably distributed [20] or a combination of Darwinism and "bullet-biting" where the hope of keeping each group in society in its place is to be accomplished by so debilitating our economy so no one can afford to make any demands.

The desirability of instituting full employment monetary and fiscal policies in tandem with a NPCIC is clear and I anticipate the Congress and the Administration will recognize its obligations in this area in the next few months. Accordingly, a National Energy Policy must be developed that is consistent with a NPCIC and the concomitant expansionary fiscal and monetary policies that prevent the redistribution of purchasing power to OPEC and domestic producers and royalty owners to take the form of a high unemployment and inflation in the U.S.

PREPARED STATEMENT OF HON. AUBREY J. WAGNER, CHAIRMAN, TENNESSEE VALLEY AUTHORITY

Mr. Chairman, it is a pleasure to appear before this committee to present TVA's views on the problems associated with concentration of ownership of our basic energy sources in this country.

Because of the vital role of energy in the Nation's economic health and social well-being, public interest demands that our sources of energy be so managed as to meet all of the people's energy needs at prices they can afford. To accomplish this there must be genuine competition in the marketplace within and among our basic fuels—coal, oil, gas, and uranium. We question whether there is sufficient competition in today's market to assure protection of the public interest.

TVA buys and burns more coal than any power producer in the country, some 35 to 40 million tons each year. And we have the Nation's largest commitment to nuclear power plants over the next ten years, so we will also be a large user of uranium in the years ahead.

We are vitally interested in what happens to the cost of these and other basic fuels because a part of TVA's statutory responsibility is to provide electricity at the lowest feasible cost to portions of seven southeastern states containing a population of 6.5 million people. We also serve the rest of the Nation as a yardstick to provide figures on what it costs to produce electricity on our system and what the components of the costs are.

TVA, like other power producers, does not *create energy.* We merely convert coal or some other basic energy source to the more useful form of electricity. On the TVA system, coal currently accounts for around three-fourths of our power production, and it is the major cost element. So the ultimate cost of electricity to our consumers is largely determined by what we must pay for coal.

I will not attempt to draw conclusions about the causes for skyrocketing prices of coal and other basic fuels in recent years. But I would like briefly to share with you TVA's coal buying experience during the period when many of the Nation's major coal producing companies have been acquired by firms engaged in other businesses, particularly the oil and gas industries.

Most of the coal company acquisitions were in the late 1960's. During the 1960's the average price of coal delivered to TVA steam plants was a little over $4 a ton. By 1974 the price had doubled to about $8.50 a ton. and the current average is up to around $17 a ton. Prices under coal contracts entered into during fiscal 1975 ranged up to $38 per ton and averaged over $20 per ton for the year.

[20] A NPCIC is not as shocking as it seems. The government already deliberately affects the after-tax income distribution via fiscal policy and President Ford is suggesting a new redistribution with his energy tax of $3 per barrel and a simultaneous reduction in other forms of taxation. It is not a big step forward to coordinate pretax income distribution as it is determined in "free" markets. Most people might find they like the results of such a policy once they get over the shock of it.

We recognize that the coal industry has experienced increases in costs as have other industries; however, we believe that the increase in prices substantially exceeds the increase in costs.

TVA's experience with power plant fuel expenses is not unique, of course. According to Federal Power Commission reports, the average costs of power plant fuel at generating plants nationwide showed increases of 100 to 150 percent for all three major fossil fuels—coal, oil, and gas—between the fall of 1973 and May of this year. That compares with an increase of about 18 percent in the Consumer Price Index during that same period.

Following the oil embargo in late 1973, the average price of fuel oil at power plants nationwide doubled in just four months. The price increase in spot coal purchased for immediate delivery was almost as dramatic, although most utility coal is purchased under term contracts and the jump in coal prices had a slower impact in overall coal supply costs. The cost of natural gas rose steadily to double since the oil embargo, in spite of the regulated prices on interstate shipments.

Since 1960, TVA's increased coal costs have coincided with the decline in the percentage of coal delivered from independent suppliers and with the acquisition of our major suppliers by large, non-coal interests. In 1960, only one of TVA's major suppliers was not an independent coal company. In recent years, of the ten major suppliers that provide more than 70 percent of TVA's coal, only one was an independent. Seven of the current major suppliers are controlled either by large oil companies or conglomerates engaged in developing or marketing oil and gas.

Although the price of coal has increased steadily as most of TVA's major suppliers have been acquired by non-coal interests, we cannot say whether, or to what extent, these increased prices resulted from the decline of the independent coal producers. But we do believe the acquisition of coal companies by large conglomerates has been a factor in reducing the competition in the overall fuels market. In addition, substantial uranium reserves have been and are being acquired by oil companies. The price of uranium has also increased.

About 85 percent of the country's electric supply comes from our basic fuels—coal, oil, natural gas, and uranium. We believe it is in the best interest of the American consumer that we have adequate competition not only among the companies which produce these fuels, but competition among the fuels as well. This competition is diminished when the same group of suppliers has major interests in all the basic fuels through horizontal integration. And this is what happens when large energy conglomerates purchase other energy producing companies and/or reserves.

We are not arbitrarily opposed to big companies in the energy business. In fact, some of TVA's most economical coal sources have been long-term contracts with large, efficient producers. And access to capital on a large scale is necessary for the increasing coal production this country will need in the years ahead. But many of the major coal producers in the country were large companies before being acquired by the non-coal conglomerates.

We firmly believe that the concentration of ownership of energy raw materials warrants close scrutiny. For example, employees of coal companies owned by conglomerates have indicated to TVA employees engaged in coal buying that proposals to open new coal mines must compete for available parent company capital with other portions of the parent company business. That is, the proposed new coal investment must offer a potential return in invested capital at least equal to the potential return on competitive non-coal investments if the proposal is to gain the parent company's approval. This is perfectly understandable from the standpoint of the parent company's business interests. But it may also create pressures which result in unduly restricting supply and increasing price—actions normally not in the public interest.

The problems would seem to increase where the parent company is an oil company. Domestic oil reserves are declining and the world price of oil is escalating. At the same time, technology is developing for liquefaction and gasification of coal which will make possible its use as a source of gasoline and as a substitute for natural gas. When oil was two or three dollars a barrel, this technology did not appear attractive. But as the cost of oil rises, the prospects for widespread utilization of this technology brighten.

So an oil company holding large coal reserves could be under pressure to hold them for future use as a source for petroleum products, or at any rate to produce coal for the current market only if it is sold at a price comparable to the prospective price for the oil and gas into which the coal might eventually be converted.

This, again, may be good "producer-oriented" policy, but it runs counter to the Nation's current need for expanded production of coal at prices representing cost plus a reasonable profit.

In summary, TVA would like to see "consumer-oriented" energy policies that encourage development of the more abundant fuels such as coal on their own merit—not on the price and profitability of oil. It is my firm conviction that anything so vital to our national survival as basic energy must be priced competitively, in close relation to the cost of producing it, not tied to the price of a disappearing, more versatile, higher value commodity like oil.

We recognize that oil companies, in their acquisition of coal and other basic energy reserves, have acted in a manner that probably serves valid interests of their own stockholders. But a basic question before this committee, and in the minds of many consumers, is whether these acquisitions and the resultant reduction in competition in the energy market are, long-run, in the best interest of the consuming public. Again, we cannot answer this question. It involves many complex variables. We can share our experiences as the Nation's largest coal buyer and as a public utility with a consumer-oriented responsibility.

I want to thank the committee for this oppotrunity to present testimony on this vital subject. We will be glad to answer any questions you might have.

Addendum to TVA Testimony Before the Subcommittee on Energy of the Joint Economic Committee

INTRODUCTION

Twelve coal-burning power plants currently supply about 70 to 75 percent of the electricity generated on the TVA power system. TVA generation from these coal-burning plants alone is normally more than 80 billion kilowatt hours a year, or more than the total output of any other power system in the United States.

These TVA plants normally require about 35 to 40 million tons of coal a year. TVA is building nuclear power plants to meet the anticipated growth in the power requirements of the region the agency supplies. However, the power system will continue to make use of the coal-burning plants as well, and TVA coal requirements will continue at roughly the present level for the next 10 years or so. TVA also may build additional coal-fired plants in the future if there is a change in the economic and other factors that have led to the choice of nuclear power for the additional generating capacity planned in recent years.

Section 9(b) of the TVA Act provides that, except in situations of emergency and certain other limited cases, all contracts and purchases made by TVA shall be made after advertising for competitive bids. TVA has determined on several occasions that an emergency has existed in its coal supply situation and has made contracts without advertising on an emergency basis when this was the only way to obtain adequate supplies.

TVA typically buys about 5 percent of its coal supply under spot contracts, which are contracts for delivery terms of four weeks or less, and the rest through term contracts covering deliveries of longer than six months. However, spot coal supplied a larger share last year for TVA as for utility coal users generally.

TVA's John Sevier, Bull Run, Kingston, and Watts Bar Steam Plants receive all or most of their coal from Appalachian sources, while other TVA plants receive coal primarily from the Midwestern field, most of it from Western Kentucky. About half of TVA's coal supply currently comes from underground mines and half from surface mines.

TVA's three newest coal-burning power plants are supplied with coal under major long-term contracts awarded at the time these plants were built. Paradise Steam Plant in western Kentucky is a mine-mouth plant, with coal delivered directly by truck from Peabody and amax mines on adjoining properties. The coal supply for the Bull Run Plant in east Tennessee comes from Falcon Coal

operations in eastern Kentucky. Most of the coal supply for Cumberland Steam Plant comes from Peabody mines on TVA's Camp Breckinridge coal reserves in western Kentucky near the Ohio River.

BRIEF SUMMARY OF TVA'S ACTIONS IN LOOKING INTO CONCENTRATION OF OWNERSHIP OF COAL COMPANIES

In late 1969 and early 1970, Mr. S. David Freeman, Director, Energy Policy Staff, Office of Service and Technology, Executive Office of the President, asked TVA to review drafts of a study entitled "Ownership and Competition in the Coal Industry." It was ou runderstanding that the study upon completion was to be transmitted to the Department of Justice Antitrust Division. In conjunction with Mr. Freeman's request, we provided information concerning difficulties encountered by TVA in attempting to contract for the purchase of additional coal supplies.

Although we are not aware of other inquiries from executive agencies, TVA has been in touch with both the Department of Justice and the Federal Trade Commission in regard to the possibility of antitrust action related to increases in prices TVA has had to pay for coal, with particular reference to possible effects of oil company acquisitions of coal concerns on coal pricing.

In 1970 the TVA legal staff examined the antitrust ramifications of oil company acquisitions of coal companies. At the same time, the General Counsel and members of the staff participated in meetings with representatives of distributor and consumer organizations in the Tennessee Valley to discuss possible courses of action. The conclusion was that the best chance of success in securing some type of antitrust action by the Department of Justice (including possible impaneling of a grand jury) or by the Federal Trade Commission would be through an approach to these agencies by electric distributor and consumer groups, representing the ultimate electric consumers, who could demonstrate the most direct economic impact from higher electric rates caused by increases in coal prices.

This course of action was followed. The Tennessee Valley Public Power Association and the Emergency Committee for the Valley sent a delegation to Washington on December 15 and 16, 1970, to visit the Justice Department, the Federal Trade Commission, the Federal Power Commission, the Office of Emergency Preparedness, and the Department of the Interior. The TVPPA and the Emergency Committee joined with the American Public Power Association and the National Rural Electric Cooperative Association in retaining the Washington, D.C., law firm of Rowley and Scott to advise and assist them in their efforts to obtain relief through antitrust action. They also retained two members of the George Washington University Department of Economics to prepare an economic analysis of price increases in the United States coal industry, which was completed in October 1974.

TVA itself has continued to speak out publicly about coal price increases and the possible relationship of such increases to changes in ownership of coal companies. This has been done in speeches and press releases (some of which have received national coverage) and in letters to the Executive Branch, as well as letters to Valley Senators and Representatives.

In June 1975, at TVA's request, TVA's General Counsel and Deputy General Counsel met with officials of both the Antitrust Division of the Department of Justice and the Federal Trade Commission to discuss possible antitrust violations associated with the marketing of coal. At that time, Counsel for TVA restated the view that a full investigation should be conducted and offered TVA's full cooperation in supplying any available information that might be useful in connection with such action.

OWNERSHIP AND OTHER DATA ON 10 LARGEST COMPANY GROUPS AND SMALLER COMPANIES SUPPLYING TVA

[Excluding steel company captive mines and companies producing primarily for steel industry, calendar year 1974]

Coal company	Ownership	Acquisition date	Preliminary estimate of production (1,000 tons)	TVA receipts (1,000 tons)	Percent of TVA receipts
Ten largest coal groups:					
Peabody Group	Kennecott Copper Corp	March 1968	68,104	9,263	30.8
Consolidation Group	Continental Oil Co	September 1966	51,754		
Island Creek Group	Occidental Petroleum Corp.	January 1968	20,848	4,185	13.9
AMAX	American Metal Climax	November 1969	19,949	2,229	7.4
Pittston Group			17,382		
Arch Mineral Corp. & Subsidiaries.	Ashland Oil and others	Approximately 1969.	12,455	1,268	4.2
North American			9,772		
Peter Kiewit Group			9,697		
Old Ben	Standard Oil Co. of Ohio	August 1968	9,452	1,661	5.4
Eastern Associates	Eastern Gas & Fuel Association.		7,698		
Subtotal			227,111	18,561	61.7
Smaller companies supplying TVA:					
Pittsburg & Midway	Gulf Oil Corp	September 1963	7,528	2,204	7.3
Zeigler Coal Co	Houston Natural Gas Corp	December 1973	4,013	919	3.1
Falcon Coal Co., Inc	Falcon Seaboard, Inc	October 1970	3,442	2,779	9.2
Webster County Coal Corp.	MAPCO, Inc	Early 1971	2,423	1,052	3.5
Clear Creek Coal Co., Inc	Anchor Gasoline Corp	Fall of 1970	115	94	0.3
Subtotal			17,521	7,048	23.4
Total			244,632	25,609	85.1
Total U.S. bituminous and lignite production (est.)			601,000		
Total TVA receipts				30,084	

AMOUNT AND COST OF COAL BURNED ON THE TVA SINCE 1960

Since 1960 the use of coal in TVA power plants has roughly doubled as additional coal-fired generating plants were completed to meet the region's increased use of electricity. As shown in Exhibit 1, coal consumption rose from about 18 to 19 million tons annually in the early 1960's to more than 37 million tons in the 1974 fiscal year. Coal consumption declined to about 33 million tons in fiscal 1975, largely because of the efforts made by TVA to limit coal consumption and obtain more power from other sources before and during the United Mine Workers of America strike in November and December of 1974. Coal consumption in the fiscal year that began July 1, 1975, is expected to rise to about 39 million tons, based on preliminary estimates.

The prices for utility coal were generally stable in the 1960's, and average cost per ton of coal burned on the TVA system remained between $4 and $4.50 a ton through that period. In 1970 the market price of coal increased very sharply. Although that increase did not immediately affect the bulk of TVA's coal's supply under existing long-term contracts, it was followed by substantial increases each year in the average cost of all coal burned in TVA plants. By fiscal year 1974 this average reached $8.61 a ton, a total increase of nearly 100 percent in five years.

The market price of coal showed an enormous increase in the 1974 calendar year. Exhibit 2, presenting monthly averages for the cost of coal burned, traces the impact of these higher prices on TVA fuel expense. This average cost of coal burned showed an increase of about 100 percent between the end of the 1974 fiscal year ($8.85 a ton in June 1974) and the end of the 1975 fiscal year ($18.33 a ton in June 1975). With the gradual moderating trend in coal prices that followed the end of the coal strike, average fuel expense at TVA plants is now showing a more stable trend for the present. For the first three months of the current fiscal year (July through September), the average cost of coal burned was $17.49.

In fiscal year 1960 the total cost of coal burned on the TVA system was $82 million. By 1974 it had multiplied to about $322 million, reflecting both the doubling average cost and doubling in the amount consumed. In 1975 this total jumped more than $430 million, even with the reduction in consumption, as the average cost per ton burned was $12.99 for the year. If system coal consumption

in the current fiscal year reaches the estimated amount, and the average cost per ton follows the level experienced so far, the total cost of coal burned in fiscal 1976 would be about $680 million.

It is important to recognize that the average cost of coal burned at any given time actually covers a range of differing prices under individual contracts. This range reached extreme dimensions in the past year, when some coal was being received under older contracts at prices of $5 to $10 a ton while at the same time some coal purchased in the 1974 peak price period was costing $30 a ton or more. That range has been narrowing as short-term high cost contracts expired and the lowest cost long-term contracts expired or had to be renegotiated under contract provisions.

COST OF COAL BURNED ON TVA SYSTEM, 1960–75

Fiscal year	Cost	Tons	Average cost per ton
1960	$82,304,773	18,606,369	$4.42
1961	83,742,091	19,150,472	4.37
1962	77,548,836	17,949,561	4.32
1963	92,409,482	21,098,020	4.38
1964	95,700,378	23,064,726	4.15
1965	91,737,485	22,500,385	4.08
1966	111,727,561	26,781,616	4.18
1967	116,048,151	26,775,877	4.33
1968	119,963,117	27,696,533	4.33
1969	138,212,861	30,889,528	4.47
1970	152,354,164	32,231,605	4.73
1971	189,620,442	32,458,437	5.84
1972	206,379,232	31,893,192	6.47
1973	262,927,477	35,412,573	7.43
1974	321,757,438	37,367,286	8.61
1975	430,597,127	33,139,949	12.99
August 1975	54,495,313	3,270,657	16.66

AVERAGE COST OF COAL BURNED BY MONTH, JANUARY 1973-AUGUST 1975

Month and year	Average cost per ton	Month and year	Average cost per ton	Month and year	Average cost per ton
1973		1974		1975	
January	$7.26	January	$9.14	January	$12.49
February	7.32	February	8.68	February	15.41
March	7.44	March	9.38	March	15.90
April	7.66	April	9.39	April	16.94
May	7.78	May	9.07	May	18.68
June	7.77	June	8.85	June	18.33
July	8.05	July	9.65	July	18.53
August	8.02	August	9.76	August	16.66
September	8.14	September	9.73	September	17.37
October	8.32	October	9.56		
November	8.34	November	10.31		
December	8.55	December	11.71		

Chairman KENNEDY. Now, we will proceed.

Our first witness today is Walter Adams, distinguished university professor, professor of economics and former president, Michigan State University.

Professor Adams, if you would come up to the witness table, we would be pleased to hear from you now.

STATEMENT OF WALTER ADAMS, PROFESSOR OF ECONOMICS, AND FORMER PRESIDENT, MICHIGAN STATE UNIVERSITY

Mr. ADAMS. Thank you, Mr. Chairman.

Mr. Chairman and members of the subcommittee, this is a joint statement prepared by me in collaboration with Mr. Joel B. Dirlam,

professor of economics, University of Rhode Island, who unfortunately is unable to be with us this morning.

We offer this statement in support of legislation which would prohibit the integrated petroleum giants from extending their control into other energy fields. We believe that such legislation is necessary if we are to preserve interfuel competition and to protect the public from an exploitative multinational cartel.

There are some who consider such legislation superfluous and/or undesirable. They contend that the petroleum industry is fiercely competitive and that the incursion of Exxon, Gulf, Texaco and their fellow oligopolists into substitute fuels has no more social significance than the decision of a local hot dog operation to diversify into hamburgers. Also, they contend that only the petroleum giants command the technical know-how and the vast capital resources to develop petroleum substitutes like coal, shale, uranium, geothermal and solar energy. They insist that only the petroleum giants can help the United States achieve the goals of Project Independence.

We disagree. We submit that the petroleum industry is not competitive in structure, nor competitive in behavior, nor competitive in performance. We submit that surrender of the substitute fuel industry to the petroleum giants will only solidify existing patterns of cartelization, and retard rather than stimulate interfuel competition. We submit that our failure to assure effective competition in the energy industry will condemn that industry to private monopolization and eventual nationalization. We believe with Thomas Jefferson that in the economic as well as in the political arena "It is not by the consolidation or concentration of powers, but by their distribution, that good government is effected."

HORIZONTAL CONTROL

At first blush, table 1 shows the concentration ratios in crude oil production do not appear to be overwhelming. Even so, it is noteworthy that concentration has been steadily increasing since the mid-1950's, so that by 1973 the 8 largest companies accounted for almost as big a share of crude oil production as did the 20 largest in 1955. This trend is largely explained by the massive mergers during this period, especially mergers between the very largest companies.

In 1965, for example, Union Oil, assets of $916.5 million, acquired Pure Oil, assets of $766.1 million.

In 1966 Atlantic Refining, assets of $960.4 million, acquired Richfield, asets of $499.6 million.

In 1968, Sun Oil, assets of $1,598.5 million, acquired Sunray DX, assets of $749 million.

In 1969 Atlantic-Richfield, assets of $2,450.9 million, acquired Sinclair, assets of $1,851.3 million.

As a result, the 20 majors of 1955 have become the 16 majors of today.

Moreover, as Prof. Walter Measday points out:

> Concentration in reserve ownership is even more important, particularly for the future, than concentration in current production. And the largest companies control most of the proved reserves. The Federal Trade Commission staff found that in 1970 our 16 major companies controlled 77 percent of the net proved oil reserves in the United States and Canada. The producer has effective control,

however, over all of the oil he lifts including the shares for royalty owners and other nonworking interest holders. In terms of gross reserves, the 16 majors may control more than 90 percent of existing proved reserves.

Finally, and most important of all, the petroleum majors are intertwined with one another through a seamless web of interlocking control. They do not function as independent or competitive, but as cooperative entities at every strategic point of the industry's integrated structure. They are meshed with one another in a symbiotic relationship which almost inevitably precludes any genuinely competitive behavior.

Joint ventures are one manifestation of this symbiotic relationship. A joint venture establishes a community of interest among the parents and a mechanism for avoiding competition between them. It provides the opportunity for foreclosing nonpartners from access to supplies and/or access to markets. It is a forum in which ostensible competitors can meet to exchange information and coordinate plans with apparent impunity. Most important, perhaps, it is a device which, in the oil industry at least, has so far remained immune from antitrust attack.

As table 1A indicates, the major oil companies customarily resort to joint ventures in bidding for Federal offshore lease sales. Thus, Amerada-Hess submitted zero independent and 168 joint bids during the period; Getty, zero independent and 281 joint bids; Phillips, zero independent and 168 joint bids; Union, zero independent and 245 joint bids; et cetera. This, according to Prof. Walter Mead, is tantamount to bid rigging:

> In any given sale, it is obvious that when four firms, each able to bid independently, combine to submit a single bid, three interested, potential bidders have been eliminated, that is, the combination has restrained trade. This situation does not differ materially from one of explicit collusion in which four firms meet in advance of a given sale and decide who among them should bid—which three should refrain from bidding—for specific leases and, instead of competing among themselves, attempt to rotate the winning bids. The principal difference is that explicit collusion is illegal.

Indeed, explicit collusion has been illegal per se ever since bid rigging was condemned in *United States* v. *Addyston Pipe & Steel Co.* in 1898.

Table 2 shows how similar joint ventures are employed by the major oil companies in their control of interstate pipelines and in table 3 their overseas production and marketing properties. In all, according to some estimates, these joint ventures provide upwards of 12,000 occasions per year for so-called competitors, the joint venture parents, to meet to discuss their common problems and the means for resolving them. Reinforced by top level financial interlocks, they are the cement which binds together a looseknit cartel into a cozy system of mutual interdependence. Without joint ventures, the dominion of big oil might be subject to recurrent competitive disturbances.

Obviously, then, such concentration ratios as we have presented in table 1 seriously and systematically understate the pervasive horizontal control of the petroleum giants.

VERTICAL CONTROL

Vertical integration reinforces this pattern of horizontal dominance by the petroleum giants. It is the mechanism for harnessing market power and transmitting it through the successive stages of produc-

tion, refining, transportation and marketing. It constitutes the primary barrier to new competition, because specialized firms at any one stage of the industry must live at the suffrance of the integrated majors, vulnerable to the constant threat of price squeezes, the denial of supplies, the foreclosure from markets. The very fact of vertical integration, therefore, militates against workable competition in this industry. It relegates competition to the interstices and fringes of the marketplace.

As the FTC concluded in its recent petroleum report, "The vertical integration system contained all the elements essential to a squeeze on refining profits and could be overcome only if the potential refining entrant could enter the industry on a vertically integrated basis." [1] By thus raising the cost of entry at the refining stage, vertical integration in and of itself becomes a formidable entry barrier which few newcomers can afford to hurdle. It is also a barrier to the established independent refiners many of whom eventually give up the battle for survival and sell out to their integrated rivals. Acquisition of independent refiners accounted for 40.7 percent of the increase in refining capacity among the top 20 oil companies between 1959 and 1969.

The control of pipelines by the vertically integrated majors has the same anticompetitive effects. It gives the majors the power to mollify, discipline, coerce, and exclude their nonintegrated competitors. It gives them the power to determine the conditions for entry and the rules for survival in the petroleum industry.

Interestingly enough, Prof. Thomas G. Moore, who is sharing the witness table with me this morning, and who presumably will dissent from our policy recommendations, is on record in support of the foregoing analysis. Writing in 1971, he stated:

> With the largest four firms controlling less than a third of the refinery capacity, the petroleum industry is far from one of the more concentrated industries in the United States. Yet with their huge size and by being vertically integrated from exploration and development to refining and marketing, the majors are in a position to dominate the industry and perhaps to control it.

THE ROLE OF GOVERNMENT

A final word about the role of government vis-a-vis the petroleum industry. Historically, the government has done for the oil companies what they could not legally do for themselves without clear violations of the antitrust laws. Under the guise of conservation and national defense, the Bureau of Mines has set national output quotas, the States authorized prorationing schemes, the Congress approved the Interstate Oil Compact, as well as legislating tariff protection and import quotas. In addition, it subsidized the multinational giants with special tax off-sets, and both the domestic and multinational producers with a magnanimous depletion allowance. It made the petroleum industry a government-sanctioned, government-protected, government-subsidized cartel, and enabled it to operate a finely tuned output-restriction, price-maintenance scheme on a worldwide scale.

[1] Investigation of the Petroleum Industry, 1973, p. 26.
[2] "The Petroleum Industry," in *"The Structure of American Industry,"* 4th edition, edited by Walter Adams, 1971, p. 128.

THE PUBLIC POLICY CHALLENGE

Recent events, especially since the Arab oil embargo, have done little to diminish the market control of the petroleum giants. To be sure, the nationalization, tax, and royalty policy of some OPEC countries has had a devastating effect on the owned equity of the multinational giants, especially in the Middle East, but this has not loosened their worldwide grip on refining, marketing, and transportation. Indeed, it may be quite reasonable to view the multinational majors as the marketing agents and tax collectors for the OPEC cartel, doing for the cartel what it appears incapable of doing for itself: Namely to proration output among the cartel members in order to maintain an exploitative price level on a worldwide scale.

Similarly, Project Independence, born in the wake of the oil embargo, is not likely to weaken the control of the petroleum giants. On the contrary, Project Independence will make us more dependent than ever on the firms now dominating the energy industry. Not only will it assure the maintenance of exorbitant petroleum prices but yield to the owners of petroleum reserves a windfall gain in the value of those reserves. Moreover, it will strengthen the bargaining position of the dominant firms in obtaining concessions from a Government intent on procuring, coute-que-coute, additional supplies for an energy-starved economy. And this may involve ad hoc antitrust exemptions, the relaxation of environmental standards, special concessions with respect to the development of Alaskan and Outer Continental Shelf deposits, deregulation of natural gas, and above all license to invade competing energy fields. In short, Project Independence, may well become the pretext for a further consolidation of control by the petroleum giants, not alone in oil and natural gas, but in substitute fuels as well. The trend, as table 4 shows, has already begun.

Against this background, we ask whether it is desirable, in the public interest, to permit the major oil companies to move into those energy fields which, after 1985, will be increasingly vital in assuring the Nation of independence from foreign supplies. Specifically, should we, by a major policy decision today, permit the petroleum giants to play a significant role in determining what energy substitutes shall be developed, at what rate, at what cost, and at whose expense?

Chairman KENNEDY. Let me ask you. If we make a decision that we find there may be a serious problem in terms of competition and within the oil industry as structured today, but that it does not present any more of a real threat in terms of our economy than perhaps other concentrations, if we make that judgment, do you feel that there is an additional danger if we permit the oil companies to get into these alternative sources of energy?

Do you make that point or do you say if you make a finding that the major oil industry today is excessively concentrated, that the fact that it's going to go into these alternative sources of energy is even going to compound the problem?

Mr. ADAMS. Well, the concentration and control exercised by the petroleum giants today compounds the problem, but I certainly think that——

Chairman KENNEDY. But even if you don't make a finding that it is significant or as pervasive as you say here, do you feel they're going to get into other energy fields, and that whatever kinds of problems exist are going to be significantly compounded?

Mr. ADAMS. Absolutely, absolutely.

The question really is whether we shall delegate to a private power complex subject neither to the discipline of competition nor to effective Government regulation nor with a reassuring record of public service, the right to plan our industrial future?

In shaping public policy, we must be mindful of two central principles: First, no person can serve two or more masters and be equally loyal to each; and second, no person can reasonably be expected to compete with himself. Now, these are central public policy guidelines which are applicable to our problem.

If this be so, can we place our faith in private profit maximization by the petroleum giants as the mechanism for promoting the public interest and protecting the general welfare? When a giant business firm is engaged in multidimensional operations, when it can choose among its various investments, retarding or suppressing some while favoring others, what guarantees do we have that its price and product policy will be the same as that of many independent competing firms immune from any conflicts of interest?

When investment strategies and price policies are shaped not by vigorous and independent marketplace competition but by committees of top executives of Exxon, Gulf, Texaco, Mobil, Socal, et cetera, what guarantees are there that energy scarcities will not be intensified rather than moderated? Can we really expect these giant firms to undermine their stake in depletable oil and gas resources, the value and profitability of which are enhanced by their progressive scarcity, by investing the huge sums required to promote the rapid development of economically viable substitutes? Can these firms be realistically expected to unleash those Schumpeterian gales of creative destruction which would signal an end to their market dominance?

Before we convey control over the new, untested, and yet to be developed energy source to the same giants which have geared their corporate policies to domestic and international cartelization, let us reexamine their track record. Have these firms fought against prorationing and similar output limitation schemes in the United States? Have they waged war against tariffs and import quotas which raised the price of oil to American consumers? Did they try to undermine or subvert the Arab oil embargo? During the years when they were undisputed masters of overseas production, did they maximize output in those areas where the American taxpayer subsidized their concession rights?

Or did they do precisely the opposite? Did not these firms which now pose as the new champions of competition in energy dedicate themselves to production limitation by private means where possible, and by manipulation of governments were necessary, in order to maintain the price structure they considered palatable? Have they not come

as close to cartelization, under Government sponsorship, as any U.S. industry? Finally, what is there in the habits, history, temperament, and experience of these mammoth enterprises on the basis of which one could predict a reversal of these monopoloid proclivities.

In conclusion, Mr. Chairman, we do not deny that to bring substitute fuels to fruition demands tremendous investments. But is the petroleum industry prepared to make these investments in the form of private risk-taking? Or it it not asking the Government to do so, while it invests in the promotion of interfuel and intrafuel mergers, and in such nonenergy, conglomerate ventures as Marcor, Ringling Bros., and the New York Knickerbockers? And, most important of all, where is the competition upon which we would have to rely if the patterns of cartelization and monopolistic exploitation are to be avoided?

We respectfully submit that the Exxons of this world will not suddenly or voluntarily surrender their market control. Nor will they start competing against themselves in defiance of the laws of profit and power maximization, and indeed, the laws of self-preservation. If the public interest is to be protected by competition in the energy market, some form of horizontal divestiture legislation will have to be enacted to assure effective interfuel rivalry.

Thank you, Mr. Chairman.

Chairman KENNEDY. Thank you very much.

[The tables referred to in Mr. Adams' statement follow:]

TABLE 1.—CONCENTRATION IN U.S. CRUDE OIL PRODUCTION[1]

	1955	1960	1965	1970	1973
4 largest	21.2	23.9	27.9	31.0	33.8
8 largest	35.9	38.2	44.6	49.1	53.8
20 largest	55.7	57.6	63.0	69.0	76.3

[1] Company gross production.

Source: Federal Trade Commission, Bureau of the Census, company reports.

TABLE 1A.—JOINT BIDDING IN FEDERAL OFFSHORE LEASE SALES (1970–72)

Company	Number of independent bids	Number of joint bids
Amerada-Hess	0	168
Amoco	6	321
Atlantic-Richfield	12	293
Chevron	79	108
Cities Service	7	372
Continental	27	384
Exxon	80	0
Getty	0	281
Gulf	17	32
Marathon	24	214
Mobil	8	103
Phillips	0	169
Shell	59	93
Sun	115	2
Texaco	15	32
Union	0	245

TABLE 2.—*Typical Joint Ventures in the Oil Pipeline Industry*

Pipeline company and co-owners	*Percent held by each*
Colonial Pipeline Co.: [1]	
Amoco	14.3
Atlantic-Richfield	1.6
Cities Service	14.0
Continental	7.5
Phillips	7.1
Texaco	14.3
Gulf	16.8
Sohio	9.0
Mobil	11.5
Union Oil	4.0
Olympic Pipeline Co.: [2]	
Shell	43.5
Mobil	29.5
Texaco	27.0
West Texas Gulf Pipeline Co.: [3]	
Gulf	57.7
Cities Service	11.4
Sun	12.6
Union Oil	9.0
Sohio	9.2
Texas-New Mexico Pipeline Co.: [4]	
Texaco	45.0
Atlantic-Richfield	35.0
Cities Service	10.0
Getty	10.0

[1] Assets equal $480,200,000.
[2] Assets equal $30,700,000.
[3] Assets equal $19,800,000.
[4] Assets equal $30,500,000.

TABLE 3.—*Selected Major International Joint Ventures of Large Integrated Petroleum Companies*

Arabian American Oil Co.:	*Percent*
Texaco	30
Exxon	30
Chevron	30
Mobil	10
1971 crude production=1,449.05 million barrels.	
Iranian Oil Participants, Inc.:	***Percent***
Mobil	7.00
Exxon	7.00
Chevron	7.00
Texaco	7.00
Gulf	7.00
B.P.	40.00
Shell	14.00
Atlantic	1.67
Signal	.83
Getty	.83
1971 crude production=1.3 billion barrels.	
Iraq Petroleum Co.:	***Percent***
B.P.	23.750
Shell	23.750
Exxon	11.875
Mobil	11.875
Kuwait Oil Co., Ltd.:	***Percent***
Gulf	50
B.P.	50
1971 crude production=1.27 billion barrels.	

TABLE 4.—DIVERSIFICATION IN THE ENERGY INDUSTRY BY THE 25 LARGEST PETROLEUM COMPANIES, RANKED BY ASSETS, 1974

Petroleum company	1974 assets (million)	Rank in assets	Energy industry				
			Gas	Oil shale	Coal	Uranium	Tar sands
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Exxon	$31,332.4	1	X	X	X	X	X
Texaco	17,176.1	2	X	X	X	X	
Mobil Oil	14,074.3	3	X	X		X	
Gulf Oil	12,503.0	4	X	X	X	X	X
Standard Oil of California	11,640.0	5	X	X	X	X	X
Standard Oil (Indiana)	8,915.2	6	X	X	X	X	X
Tenneco	6,401.6	7	X			X	
Atlantic Richfield	6,151.6	8	X	X	X	X	X
Shell Oil	6,128.9	9	X	X	X	X	X
Continental Oil	4,673.4	10	X	X	X	X	
Sun Oil	4,063.3	11	X	X	X	X	X
Phillips Petroleum	4,028.1	12	X	X	X	X	X
Union Oil of California	3,458.6	13	X	X		X	
Occidental Petroleum	3,325.5	14	X	X	X	X	
Getty Oil	3,003.6	15	X	X		X	
Cities Service	2,897.9	16	X	X		X	X
Standard Oil (Ohio)	2,621.5	17	X	X	X	X	
Amerada-Hess	2,255.3	18	X			X	
Marathon Oil	1,799.9	19	X	X		X	
Pennzoil	1,797.9	20	X			X	
Ashland Oil	1,715.8	21	X	X	X	X	
Coastal States Gas	1,696.9	22	X		X		
Signal Cos	1,532.9	23	X				
Kerr-McGee	1,164.4	24	X	X	X	X	
Murphy Oil	1,041.6	25	X				

Source: National Economic Research Associates.

Chairman KENNEDY. We will, before getting into the detailed questions, hear from Mr. Moore first. Mr. Moore, we are glad to have you here. We'd like to hear your testimony.

STATEMENT OF THOMAS GALE MOORE, SENIOR FELLOW, THE HOOVER INSTITUTION ON WAR, REVOLUTION, AND PEACE

Mr. MOORE. Thank you, Mr. Chairman.

It is a great privilege and honor to be here today. We are concerned today with the competitiveness of one of our most basic and vital industries, the petroleum industry. It is essential to be eternally vigilant about competitiveness of our economy. Too often government has encouraged monopoly rather than competition.

I must emphasize that the oil industry in particular has been subject to many governmental favors in the past and numerous attempts to foster cartel pricing. For years, the oil industry has benefited from special provisions of the tax laws some of which are only now being phased out. The oil import quota system protected domestic oil producers and resulted in considerably higher domestic prices than foreign prices throughout the 1960's. Prorationing boosted domestic oil prices and resulted in significant inefficiencies.

I might divert a little bit from my prepared testimony to comment first. Professor Adams pointed out that the oil companies did not object to quotas and prorationing. I don't see how he or anybody else could expect them to do so. These policies obviously increase their profits, and if I had been a stockholder, I would have objected to the president of Exxon not wanting prorationing.

Chairman KENNEDY. But I suppose it's rather that the prorationing was really symptomatic of a number of different things

that were mentioned in the testimony. You mentioned three or four. You could carry it on up to the point where the major oil companies were objecting to a refinery up in Machias Port off the coast of Maine, you know, at a time when New Englanders were trying to deal with and cope with the fact of limited product availability. This refinery really wouldn't be much of a threat to them.

But I think the point was about a pattern of conduct which would raise questions whether they had really been pursuing or looking at the consumers' interest. I don't think any of us are naive enough to think that they aren't going to be pursuing their corporate responsibilities and trying to maximize profit, but I do feel that probably coming from a part of the country that's as familiar on this issue as any of the others, that there has been a course of conduct, by the companies, which I suppose borders on a serious lack of concern for consumers.

Mr. MOORE. I agree, Senator, but the fact that the wheat producers in the United States have supported wheat support prices in the past does not mean that the industry is not competitive. In fact, going to the Government to get cartel support legislation reflects an inherent competitiveness in an industry which it can't eliminate without Government help.

Today, the Government's policy seems to be aimed at squeezing domestic oil producers to aid the OPEC cartel. Holding domestic oil prices down only discourages domestic production and exploration while encouraging consumption. The result is that imports are higher and the foreign cartel is supported.

Both the earlier policy of favoring domestic oil producers and the current policy of taxing them is wrong. The oil industry, if left alone, would be basically competitive. There is no need to break up oil companies or force them to divest their holdings of other energy resources.

While it is politically popular to denounce the oil companies for higher prices and to point to their large profits, profits have dropped in recent quarters, a sign that competition has eroded such profits. Basically the energy industry is highly competitive. In the final report by the Energy Policy Project of the Ford Foundation, the authors concluded somewhat reluctantly that "Compared with other major industries, concentration ratios are low, long term profit rates are generally average, and entry moderately free."

In 1970 the four largest crude oil producers in the United States sold 30.5 percent of all crude, the four companies with the largest proved reserves had 37.2 percent of all U.S. reserves. In 1972, the largest four refiners produced 33.1 percent of all gasoline. It should be noted that the four largest crude oil producers are not the four largest refiners nor the four largest retailers. In fact, the third largest crude oil producer in 1970, Gulf Oil, was the sixth largest refiner in 1972, and the fifth largest seller of gasoline in 1973.

These concentration ratios indicate that the industry is not controlled by a handful of firms. In fact, these firms are all quite similar in size. Unlike many other industries, no one or two firms dominate. For example, the largest firm, Standard Oil of New Jersey, had 9.1 percent of the domestic refining capacity in 1972; the next largest, Texaco, had 8.4 percent, followed by Shell with 8.1 percent. The 15th largest, Cities Service, still had 2.1 percent of the capacity. By no sense of the word

can this industry be described as monopolistic or even oligopolistic. It's big, though, and that seems to be the problem.

A similar but even less concentrated situation exists in natural gas production. The largest four producers had 25.3 percent of the interstate pipeline sales in 1970. The largest producer, Exxon, had 9 percent of the total, while the next largest had 5.6 percent. On the other hand, the four largest pipeline buyers of natural gas had 38.5 percent of the market in 1968 down from 45.2 percent in 1961. The market structure on both the buyer and seller side could best be described as competitive, although in earlier years, it appears that pipelines might have been able to exercise some oligopolistic control of natural gas prices.

Performance is consistent with a competitive industry. In the period 1950 to 1973 the average price of gasoline excluding tax in constant dollars declined 32 percent, nearly a third. Over the same period, output per man-hour tripled. But profits have not been larger than in other sectors of the economy. The average profit rate of the 20 largest oil firms in the 1967–72 period was 10.8, exactly equal to the average for all maufacturing in the 1967–71 period.

Edward J. Mitchell in his book "U.S. Energy Policy: A Primer," reported that he looked at the rate of return to an investor in oil company stock with dividends reinvested over the 1953–72 period and the 1960–72 period. He argued that if oil companies were earning any monopoly profits, it would show up in the rate of return over such a long period. The result was that investors in U.S. oil company stocks did noticeably less well than the stock market as a whole. The table in my prepared statement gives the average rates. If the oil producers or refiners had been in a position to control the market, the industry would have been more profitable rather than less profitable than other industries.

These proposals can be viewed as an effort to reduce concentration in the energy market generally. But concentration is low in this market. In 1970, the largest four firms in terms of Btu production in the United States produced 21.2 percent of all the Btu's. While it is true that this level of concentration has increased from an even lower level earlier, mergers have not played a major role. Two of the largest mergers were the purchase of Consolidation Coal by Continental Oil and the purchase by Gulf of Pittsburgh and Midway Coal. If these mergers are subtracted from the energy output of the oil companies, in other words, if these mergers had not taken place, then the four firm concentration level would not have been 21.2 but 19.9, a 1.3 difference. In other words, the effect of these mergers, which have caused so much concern and which have contributed to the support of these proposals, has been to increase concentration by 1.3 percentage points.

Thus we have a basically competitive industry, oil, diversifying into related industries. Should this be stopped or rolled back? Certainly there is nothing in the current situation that appears to be anticompetitive. Thomas Duchesneau in "Competition in the U.S. Energy Industry," concludes:

> The general policy conclusion with respect to interfuel competition is that oil entry into coal and uranium has not resulted in monopolization of the Nation's energy supplies, and antitrust action to halt further entry and/or require divestiture, is not economically justified on the basis of the current situation.

He goes on to say that:

An outright ban on the entry of oil firms into coal and uranium probably has little economic justification. Such entry into coal, while posing a danger to interfuel competition, has also had procompetitive effects in several instances.

For example, from 1968 to 1970 Consolidation Coal, which is owned by Continental Oil, increased its output 25 percent and developed 17 new mines while industry output simultaneously actually declined. Thus, oil companies seem to be more expansion minded, more able to tap capital markets, and more competitively oriented than established coal companies.

As a general rule, it is often the outsider that brings innovations and new competitive vigor to an industry. To ban oil and gas companies from moving into other energy areas is more likely to harm competition than to promote it. There is no evidence that oil firms are soon likely to dominate the energy market, and if that day does arise, then the Justice Department can act under existing antitrust legislation to stop or reverse the trend.

Let me end by emphasizing that the major problem with the energy industry has been Government control. For years oil import quotas and prorationing were used to raise domestic oil prices and increase the profits of oil producers.

Chairman KENNEDY. Why did the oil companies try and insist on it? You take the oil import program, which you all know was put on by the major oil companies. It is a classic story where Bob Kerr did that in 1957 in terms of support for the civil rights bill. Everybody knows that.

Mr. MOORE. Why did they do that?

Chairman KENNEDY. Well, if you're talking about Government interference in this, for years there have been oil import quotas. For years, you say:

The major problem with the energy industry has been government control. For years oil import quotas and prorationing were used to raise domestic oil prices and increase the, profits of oil producers. Naturally this led to considerable waste and harmed competition.

Well, they were the ones that were promoting it.

Mr. MOORE. Sure, and so were the farmers promoting the——

Chairman KENNEDY. But what I mean, I gather from your statement that all this Government interference was not at the behest of the oil companies. You're not trying to make that point, are you?

Mr. MOORE. Oh, no I'm not. The oil companies wanted it, certainly. I hold the Government responsible, though, for essentially being——

Chairman KENNEDY. For acquiescing.

Mr. MOORE. For acquiescing, yes.

Chairman KENNEDY. Well, what does that tell you about the power of the companies?

Mr. MOORE. Well, it tells me that they have had in the past considerable influence on Government policy.

Chairman KENNEDY. Does that bother you at all?

Mr. MOORE. Yes, it does. but there are lots of other industries that do.

Chairman KENNEDY. Well, I'm not talking about others, just about those.

Mr. MOORE. And at the moment it looks to me like they've lost all their influence.

Chairman KENNEDY. Do you really believe so?

Mr. MOORE. Well, they've lost a great deal of their influence. The present oil policy is damaging, at least to the domestic oil producers, and helping the OPEC cartel. The only way you can explain the current oil policy and frankly the legislation Congress is just passing is somehow the Arabs are the nifluential group now.

Of course, this is the policy at the moment.

Chairman KENNEDY. The Arabs are the influential group?

Mr. MOORE. Yes. The policy at the moment increases imports of oil and discourages domestic production. Domestic oil companies are not benefitted by that policy. Domestic oil companies have also lost the depletion allowance. I'm very grateful for that. I'm glad the Congress has seen fit to do away with that.

Chairman KENNEDY. Is there anything else we ought to be doing?

Mr. MOORE. You ought to at this point abolish prorationing and the "Connolly Hot Oil Act". We should remove authority for the Federal Government and the President to establish import quotas again. I very much fear that in the future when the oil cartel breaks down and prices come down abroad, that we will see a real push to improve oil import quotas on again to maintain domestic prices. We should therefore abolish the authority of the President to impose quotas and import fees or taxes as are now levied on imports.

The problems with the energy industry originates right here in Washington. It came from Government controls. What we do not need is more legislation, more controls, or more bureaucrats running the energy industries. The best thing this committee could do for the public is to recommend the abolition of prorationing, price controls, market allocations, import tariffs and fees for both oil and natural gas.

Thank you.

[The prepared statement of Mr. Moore follows:]

PREPARED STATEMENT OF THOMAS GALE MOORE

Mr. Chairman. It is a great privilege and honor to be here today. We are concerned today with the competitiveness of one of our most basic and vital industries, the petroleum industry. It is essential to be eternally vigilant about the competitiveness of our economy. Too often Government has encouraged monopoly rather than competition.

I must emphasize that the oil industry in particular has been subject to many governmental favors in the past and numerous attempts to foster cartel pricing. For years the oil industry has benefited from special provisions of the tax laws some of which are only now being phased out. The oil import quota system protected domestic oil producers and resulted in considerably higher domestic prices than foreign prices throughout the 1960's. Prorationing boosted domestic oil prices and resulted in significant inefficiencies.

Today, the Government's policy seems to be aimed at squeezing domestic oil producers to aid the OPEC cartel. Holding domestic oil prices down only discourages domestic production and exploration while encouraging consumption. The result is that imports are higher and the foreign cartel is supported.

Both the earlier policy of favoring domestic oil producers and the current policy of taxing them is wrong. The oil industry, if left alone, would be basically competitive. There is no need to break up oil companies or force them to divert to other energy resources. The industry can and will act in a reasonably competitive manner if the Government leaves it alone.

Part of the reason that the Congress and the Government are concerned with the oil industry is due to its sheer size. The largest company in the world is an oil firm—Exxon. Out of the largest ten industrial companies in the United States, four are oil companies. In addition, as a result of an international cartel of oil

producing governments, oil prices have shot up—it has been easy to blame this increase on the oil companies since they had to increase the prices they charged for their products.

While it is politically popular to denounce the oil forms for higher prices and to point to large profits—their profits have dropped in recent quarters—as signs that competition is not vigorous, the facts do not support that position. Basically the energy industries appear to be highly competitive. Even hostile critics have been unable to find evidence to the contrary. For example, in A Time to Choose, the final report by the Energy Policy Project of the Ford Foundation, the authors concluded somewhat reluctantly that "Compared with other major industries, concentration ratios are low, long term profit rates are generally average, and entry moderately free." [1] I say reluctantly because the report is very biased against the free market and particularly the oil companies.

By all the usual standards, the oil companies and the energy industry is competitive. In 1970, the four largest crude oil producers in the United States sold 30.5 percent of all crude, the four companies with the largest proved reserves had 37.2 percent of all U.S. reserves, in 1972 the largest four refiners produced 33.1 percent of the output, and the largest retailers nationwide sold 29.2 percent of all gasoline. It should be noted that the four largest crude oil producers are not the four largest refiners nor the four largest retailers. In fact, the third largest crude oil producer in 1970, Gulf Oil, was the sixth largest refiner in 1972, and the fifth largest seller of gasoline in 1973.[2]

These concentration ratios indicate that the industry is not controlled by a handful of firms. In fact, these firms are all quite similar in size. Unlike many other industries, no one or two firms dominate. For example, the largest firm, Standard Oil of New Jersey, had 9.1 percent of the domestic refining capacity in 1972; the next largest, Texaco, had 8.4 percent, followed by Shell with 8.1 percent. The fifteenth largest, Cities Service, still had 2.1 percent of the capacity.[3] By no sense of the word can this industry be described as monopolistic or even oligopolistic.

A similar but even less concentrated situation exists in natural gas production. The largest four producers had 25.3 percent of the interstate pipeline sales in 1970.[4] The largest producer, Exxon, had 9.0 percent of the total, while the next largest had 5.6 percent. On the other hand, the four largest pipeline buyers of natural gas had 38.5 percent of the market in 1968 down from 45.2 percent in 1961.[5] The market structure on both the buyer and seller side could best be described as competitive, although in earlier years, it appears that pipelines might have been able to exert some oligopolistic control on natural gas prices.

Not only is industry structure competitive, but performance is consistent with a competitive industry. In the period 1950 to 1973, the average price of gasoline excluding tax in constant dollars declined 32 percent.[6] Over the same period, output her manhour tripled.[7] But profits have not been larger than in other sectors of the economy. The average profit rate of the twenty largest oil firms in the 1967–1972 period was 10.8, exactly equal to the average for all manufacturing in the 1967–1971 period.[8]

Edward J. Mitchell in his book, U.S. Energy Policy: A Primer, reported that he looked at the rate of return to an investor in oil company stock with dividends reinvested over the 1953–1972 period and the 1960–1972 period.[9] He argued that if oil companies were earning any monopoly profits, it would show up in the rate of return over such a long period. The result was that investors in U.S. oil company stocks did noticeably well than the stock markets as a whole. The attached table gives the average rates, page 9. If the oil producers or refiners had been in a position to control the market, the industry would have been more profitable rather than less profitable than other industries.

The objective of divestiture proposals is to deal with the expansion of oil and gas companies into other energy fields, thus becoming truly all-round energy companies. There is much to be said in favor of such expansion but before I discuss

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[1] (Ballinger Publishing Co., Cambridge, Mass., 1974), p. 238.
[2] T. D. Duchesneau, "Competition in the U.S. Energy Industry" (Cambridge, Mass.: Ballinger Publishing, 1975), pp. 38–45.
[3] Ibid., p. 44.
[4] Ibid., p. 67.
[5] Duchesneau, p. 70.
[6] Ibid., p. 154.
[7] Ibid., p. 156.
[8] Ibid., p. 157.
[9] (Washington, D.C.: American Enterprise Institute, 1974), pp. 92–95.

that, it might be wise to indicate the market structure of the energy industry generally.

These proposals can be viewed as an effort to reduce concentration in the energy market generally. But concentration is low in this market. In 1970, the largest four firms in terms of BTU production in the United States produced 21.2 percent of all the BTU's. While it is true that this level of concentration has increased from an even lower level earlier, mergers have not played a major role.

Two of the largest mergers were the purchase of Consolidated Coal by Continental Oil and the purchase by Gulf of Pittsburgh and Midway Coal. If these mergers are subtracted from the energy output of the oil companies, in other words, if these mergers had not taken place, then the four firm concentration level would not have been 21.2 but 19.9. In other words, the effect of these mergers, which have caused so much concern and which have contributed to the support of these proposals, has been to increase concentration by 1.3 percentage points.

Thus we have a basically competitive industry—oil—diversifying into related industries. Should this be stopped or rolled back? Certainly there is nothing in the current situation that appears to be anti-competitive. Thomas D. Duchesneau in Competition in the U.S. Energy Industry concludes, "The general policy conclusion with respect to interfuel competition is that oil entry into coal and uranium has not resulted in monopolization of the nation's energy supplies, and antitrust action to halt further entry and/or require divestiture, is not economically justified on the basis of the current situation." [10] He goes on to say that, "An outright ban on the entry of oil firms into coal and uranium probably has little economic justification. Such entry into coal, while posing a danger to interfuel competition, has also had procompetitive effects in several instances.[11]

As Duchesneau points out, there may be some advantage to having oil companies move into other energy areas. For example, from 1968 to 1970 Consolidated Coal, which is owned by Continental Oil, increased its output 25 percent and developed 17 new mines while industry output actually declined.[12] Thus, oil comanies seem to be more expansion minded, more able to tap capital makets, and more competitively oriented than established coal companies.

As a general rule, it is often the outsider that brings innovations and new competitive vigor to an industry. To ban oil and gas companies from moving into other energy areas is more likely to harm competition than to promote it. There is no evidence that oil firms are soon likely to dominate the energy market, and if that day does arise, then the Justice Department can act under existing antitrust legislation to stop or reverse the trend.

Let me end by reemphasizing that the major problem with the energy industry has been government control. For years oil import quotas and prorationing were used to raise domestic oil prices and increase the profits of oil producers. Naturally this led to considerable waste and harmed competition. It also reduced the incentive to build domestic refineries thus eventually leading to shortages of refined products. While oil prices were being forced up, natural gas prices were being held down. We are now paying for that mistake with shortages which will only grow worse until natural gas is deregulated.

Currently we hold down the price of "old" oil while letting new oil and imported oil sell at the world price. The result is that production of old oil is reduced and we are increasingly dependent on foreign producers. Our policy is backfiring. Price controls on natural gas are also reducing domestic supplies with the result that pipelines are increasingly buying gas in Canada and elsewhere at prices much higher than they would need to be in an unregulated market—at the same time making us more dependent on foreigners.

The problems with the energy industries originate right here in Washington. They came from Government controls. What we do not need is more legislation, more controls, or more bureaucrats running the enrgy industries. The best thing this committee could do for the public is to recommend the abolition of prorationing, price controls, market allocations, import tariffs and fees for both oil and natural gas.

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[10] Duchesneau, p. 187.
[11] Ibid., p. 187–188.
[12] U.S. Congress, House Subcommittee on Special Small Business Problems of the Select Committee on Small Business, Hearings on Concentration by Competing Raw Fuel Industries in the Energy Market and its Impact on Small Business, 92d Congress, 1st session, p. 99.

AVERAGE RATE OF RETURN TO STOCKHOLDER 1953-74 AND 1960-72

	1953-72	1960-72
21 domestic refiners	11.3	11.7
5 international refiners	12.5	11.0
10 domestic oil producers	n.a.	6.3
4 overseas oil producers	n.a.	17.8
Standards & Poor's 500 Stock Composite Index	15.6	12.8

Source: Edward J. Mitchell, "U.S. Energy Policy: A Primer" (Washington, D.C.: American Enterprise Institute, 1974), table B-1, p. 94.

Chairman KENNEDY. Mr. Adams, would you like to make any comment now, and I'll ask Mr. Moore, and the record can just continue along?

I saw you writing away there.

Mr. ADAMS. Yes, Mr. Chairman. I must say that I found Professor Moore's presentation extremely stimulating indeed, food for or fuel for an additional bit of testimony.

Now, on this question of pricing, I do not think that the current high price of oil in any way discourages domestic production because the price of new oil is not controlled. Now, that is a fact. There is nothing therefore to deprive domestic oil producers of incentive to maximize their output.

Second, with respect to concentration, I think there's been a great deal of persiflage injected into the discussion and debate over concentration. I don't care how many concentration ratios are cited by the opponents of this legislation. The fact remains that these are not independent companies.

When we talk about the four largest oil companies, we have to lump them together because they function as a unit. If I may invite your attention, Mr. Chairman, to table 3 of my statement, for example. You look at the Arabian-American Oil Co. Who owns the Arabian-American Oil Co.? It's jointly owned by Texaco, Exxon, Standard Oil of California, and Mobil.

You turn to Iranian oil participants? Who owns that? Mobil, Exxon, Standard Oil of California, Texaco, Gulf, and British Petroleum, et cetera.

Iraq Petroleum by BP, Shell, Exxon, and Mobil.

Kuwait by Gulf and British Petroleum.

Chairman KENNEDY. Of course, that's rather a temporary condition with regards to Aramco and the rest. I mean, I would think within the next couple of months or so there would be a complete transformation.

Mr. ADAMS. Not at all, Mr. Chairman. The ownership situation of those countries might be changed, but as far as control over the marketing, transportation, and refining of that oil, it remains in the same hands as before. I think it was just 3 weeks ago that Sheik Yamani of Saudi Arabia indicated that Saudi Arabia will not in the future sell to independent oil companies, that the oil produced in Saudi Arabia will be marketed through the Aramco partners. Now, that means that they retain control of its disposition, and that is really what we're talking about here. That is where the power lies.

The Shah of Iran has indicated that all of the oil in Iran will be sold through the consortium partners, except for the small amount that goes to the Iranian National Oil Co.

Libya seems to be in no hurry to nationalize the Occidental properties in Libya, and again Occidental has taken a position, nationalize us and pay us off for the value of our properties. According to the "Petroleum Intelligence Weekly" a couple of weeks ago, I think it was, they indicated that Libya is in no hurry at all.

In other words, Mr. Chairman, what I am saying here is that the dominant forces in the international petroleum industry, that is, the American Petroleum giants, plus their foreign partners, the seven sisters, so-called, are today performing the same prorationing function on a worldwide scale that the Texas Railroad Commission used to perform in the prorationing of domestic oil in the State of Texas.

So what you have or what you continue to have is a cartel where the ownership may vest with the OPEC countries, but where the control of the oil continues to remain in the hands of the petroleum giants.

Furthermore, Mr. Chairman, there is no incentive whatsoever on the part of these petroleum giants to do anything that will reduce the price of that oil for one very simple reason. Every time OPEC raises the international price of oil, this simply increases the value of oil and natural gas reserves held by Exxon and Socal, Mobil, and Texaco and Shell in the United States.

Again I come back to the central guideline, the public policy that we suggested in our statement, that no firm can be expected to compete with itself. There's no reason in the world why Exxon should try to undermine the high price of OPEC oil around the world.

Chairman KENNEDY. Mr. Moore——

Mr. ADAMS. And I will say one more thing about Professor Moore's testimony. Again if I may quote from his own writings, and I am a careful student of what Professor Moore has written in the past, in 1971 he wrote, and I quote, where he summarizes his study of the oil industry.

> The result is typical of a cartel-like market. Prices are established by the majors at comfortable levels. The most efficient company sets the price that will maximize its profit, and other firms conform. Additional sales at the established price mean additional profit, with the result that the major companies compete through advertising, credit cards, trading stamps and games.

In other words, there is no price competion in the petroleum industry, as Professor Moore himself has indicated in 1971, and I wonder what has changed since 1971 for him now to say, to suggest to this subcommittee that the industry is competitive.

Furthermore, with respect to the figures on profits that he introduces, again I quote from Professor Moore:

> In effect, then, this cartel arrangement deprives the consumer of lower prices without providing the major companies with the expected profit since much of the profits are eaten up by nonprice competition.

In other words, it is the wasteful form of nonprice competition in this industry which has kept the profits down. It certainly is not the vigor of competition in the marketplace that explains the profit performance of the petroleum industry.

Now, Mr. Chairman, possibly—I don't want to keep quoting from Professor Moore.

Mr. MOORE. I would appreciate a chance to reply.

Chairman KENNEDY. Why don't you give Mr. Moore a chance?

Mr. ADAMS. Well, Mr. Chairman, one more thing. May I suggest in fairness to Professor Moore that his chapter on the petroleum industry be inserted in the record in full so that one of the quotes that I have submitted to you can be possibly taken out of context.

Chairman KENNEDY. Perhaps Mr. Moore would like to reply to that.

Mr. MOORE. Well, there are a number of points I want to raise.

First to go back to an earlier point thart Professor Adams made about new oil, their prices are not controlled in the United States. That's correct. But old oil prices are, and they are held at below market clearing levels. Holding prices down, in this case, does discourage further investment in developing and increasing the production from existing oil wells in existing fields. Therefore it discourages production in the United States. So the fact that new oil is uncontrolled is only partly relevant, and the bill that is being voted out of Congress would control new oil prices as well, with, I hope you would agree, some further discouragement of production.

Now, on my earlier writings, I haven't looked at that article in some time, but I believe the noncompetitiveness was in the context of oil prorationing, quotas, and controls which maintained higher prices with the result that led to nonprice competition which eliminated the monopoly profits.

My point in the testimony this morning is simply that if there were none of these controls, the industry would in fact behave competitively. If you look at the international market, which Professor Adams was referring to earlier, prior to the establishment of the OPEC cartel, the world price of oil was $2 or thereabouts a barrel, and the oil companies seemed to be unable to raise it by themselves. In fact, it had fallen over time, and as my testimony indicated, even in the United States in spite of the help of Government prorationing and quotas, gasoline prices fell by nearly one-third since the 1950's, which indicates some fair degree of competition. A decline in prices is not what monopoly usually produces.

Now, turning to the other point about joint bidding, I too am bothered by joint bidding, and I too am not familiar with the act that Congress has just passed, but I want to note that in Walter Adams' table No. 1, the largest oil comapny in the world, Exxon, made all of its bids, according to this table, independently, and none were joint bids.

On the other hand Amerada-Hess which made all joint bids, is in the context of the oil industry a rather small oil company. It looks on the face of it that joint bidding is procompetitive. It is one way for the small company to enter the market.

I do not read his figures as indicating that there is a cartel or that the largest companies work closely together. Certainly Exxon had all independent bids. If we are to follow his logic, there should be joint bidding with Gulf, Sun, and Texaco. But the big firms bid mostly independently—all independently—in the case of Exxon.

Chairman KENNEDY. Let me ask you, Mr. Moore, just in terms of the major oil companies on the control of coal—the purchasing of various kinds of coal companies—there are a number of oil companies that have moved into coal companies in the period from 1966 through 1971—some which you mentioned—Continental over Consolidation and affiliated companies, and Occidental taking over Island Creek and Standard of Ohio taking over Old Ben—if you review those purchases, you find virtually no increase at all in production in comparison to others—so taking that as an indicator, we will place the tables on oil firm coal production in millions of tons and selected statistics of the Consolidation Coal Co. in the record at this point.

[The tables follow:]

OIL FIRM COAL PRODUCTION

[Millions of tons]

Coal company	Parent Company	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Consolidation & Affiliated Cos	Continental	45.4	48.6	[1] 51.4	56.5	59.9	60.9	64.1	54.8	64.9	60.5	51.0
Island Creek	Occidental	21.2	20.6	23.7	25.9	[1] 25.9	30.3	29.7	22.9	22.6	22.9	20.0
Old Ben	Standard of Ohio	5.1	6.3	9.9	10.3	[1] 9.9	12.0	11.7	10.5	11.2	10.8	9.0
Pittsburg & Midway	Gulf	[1] 7.1	8.2	8.8	9.0	9.2	7.6	7.8	7.1	7.7	8.1	7.0
Hawley Fuels	Belco	1.0	2.1	1.9	1.7	[1] 1.5	1.7	1.8	1.4	1.6	1.5	1.0
Arch Minerals	Ashland	2.3	5.1	6.8	7.5	7.0	6.8	6.3	[1] 7.2	11.2	12.5	13.0
Monterey Coal	Exxon							0.3	1.2	2.0	2.7	2.0
Seven company total		82.1	90.9	102.5	110.9	113.4	119.3	121.7	105.1	121.2	119.0	107.0
Industry total		487.0	512.1	533.9	552.6	545.2	560.5	602.9	552.2	595.4	591.7	601.0
Seven company output as percent of total		16.9	17.8	19.2	20.1	20.8	21.3	20.2	19.0	20.4	20.1	17.0

[1] Year acquired by oil company.

Source: Keystone Coal Industry Manual (McGraw-Hill), various years.

CONSOLIDATION COAL CO., SELECTED STATISTICS, 1967–74

	1967	1968	1969	1970	1971	1972	1973	1974
Net income[1] (millions)	64.2	60.5	50.1	72.2	51.9	67.9	34.1	197.2
Total revenues[1]	302.1	303.9	318.1	403.2	410.4	522.4	565.2	931.8
Total new investment		29.6	48.7	55.2	50.4	45.6	23.7	101.4
Ratio of new investment to net income		.46	.97	.76	.97	.67	.69	.51
Ratio of new investment to total revenues		.10	.15	.14	.12	.09	.04	.11
Production (million tons)	48.7	51.4	53.6	57.4	49.0	58.5	54.4	47.1
Recoverable coal reserves (million tons)								
Total	6,154	6,271	6,919	7,731	8,066	10,698	12,058	[2] 13,898
Western only	903	1,058	1,342	1,860	2,008	4,497	5,592	6,950

[1] Continental Oil Co. acquired Consolidation Coal Co. through what is referred to as an "ABC transaction." This transaction involves the use of a production payment that tends to shield large amounts of income from taxation and from public disclosure through annual reports. The impact of this method of financing on actual revenues and net income has been incorporated in these figures. Further documentation is available from the UMWA Research Department.

[2] In testimony on July 14, C. Howard Hardesty announced that this figure had increased to 14,000.

Sources: 1967 through 1974 annual reports.

Chairman KENNEDY. If you take the amount of new investment as compared to other coal companies, you don't see a very significant increase by these coal companies that are now controlled by the oil companies, and yet the amounts of reserves have increased rather dramatically—coal reserves that are controlled by the major oil and gas companies.

I'm just wondering if there are any kinds of conclusions that we can draw—that over the recent past—no significant production—very little difference in terms of the increase in new investment, and rather a greater expansion in terms of the reserves. I am just wondering what this says to us as far as the future concentration in terms of that one particular energy resource?

Could you make what comments you would on that?

Mr. MOORE. Yes.

I would expect the oil companies, if they purchased a coal company or coal reserves, to act no different from anybody else who purchased it. There is a price for coal, certain investments are necessary to increase mine production, and if it's profitable to do so, I would expect a coal company to do so, whether it's owned by an aluminum firm or stockholders in New York or an oil company, and if it's not profitable, I would expect all three types of owner to operate the same way.

Chairman KENNEDY. So we shouldn't draw any significance in the fact that there has been no real increase either in production or no investment in terms of modernization. We should only draw the conclusion that their expansion in terms of coal reserves is not to be feared—we should not draw any conclusions from that either in terms of future potential problems about competition, which would exist among various energy resources.

Mr. MOORE. If the coal industry had been monopolized or cartelized, one might expect new investors coming in to perhaps invigorate the industry, but the coal industry has been a highly competitive one.

The question, I think the question the subcommittee has to think about here is if an oil company, which owns a coal company, will operate that coal company in any way differently than if it was owned by somebody else?

Chairman KENNEDY. I think that's a fair question. What is your answer to that?

Mr. MOORE. My answer is no. Would it make sense for it to say raise the price of coal that it is trying to sell from that mine to protect the oil market? It just doesn't make any sense.

Chairman KENNEDY. Well, let me say you'd have an opportunity to sell to a consumer group at a higher price for oil than they do for coal. Do you think they're going to act just the same way that a coal company would if they controlled both kinds of resources?

Mr. MOORE. Well, the market for coal is in the main for powerplants, and it really doesn't make sense for an oil-coal firm to try to increase the price of their coal that they're selling to a powerplant, or to try to increase the possibility that the power company will opt for oil instead. It doesn't make any sense because the power company can buy its coal from another source. Coal is coal—there are varieties of coal but it is a highly homogeneous substance, and a power company can buy from a variety of sources.

Chairman KENNEDY. All right.

Let me hear from Mr. Adams just on this point. We are running out of time.

Mr. ADAMS. Just on that point, Mr. Chairman, the record shows if we take Consolidation Coal Co. as an example, that in the years when it was under independent control from 1961 to 1967, Consolidation Coal doubled its output and it put into motion new construction prior to the merger with the oil companies. That momentum which was set in motion while Consolidation was still an independent company, continued through 1968 and 1970. After 1970 production declined, and especially since 1973 after the oil embargo.

Now, when we talk about a market, and in the fuel comeptition it makes a great deal of difference whether the source of that interfuel competition comes from independents who have no vested interest in the oil industry, or whether it comes from companies which are controlled by the oil industry.

If the oil industry were to promote aggressively the expansion of output of coal, if it were to develop the liquefaction of coal, if it were to perfect the technology associated with substitute fuels, it in effect would be undermining its own investment. This is essentially the conflict of interest that has to be prevented, and that is the issue before the subcommittee, and that is the logic, it seems to me of the proposed divestiture legislation.

Chairman KENNEDY. But wouldn't your prescription, in terms of divestiture, bring chaos to this other source of energy. It seems that the oil companies have both the capital for investment and have the expertise in terms of new venture kinds of program, have an understanding of the marketing of various energies, and if you do not permit them to get into this kind of thing, aren't we really eliminating an important kind of national asset that could be used in terms of the development of alternative sources?

Mr. ADAMS. Senator, we've tried to answer that point in our testimony. One, the huge funds that will be required in research and development with respect to the technology of fuel substitutes will come from the Government in any case. The private companies, it seems to me, the oil giants will not put their own money into new, untested technology.

Second, there is a strong incentive for them to retard the introduction of that technology. Professor Moore has pointed out that innovations usually come from outsiders. That is correct, if those outsiders are not controlled by the interests which the new technology, the new product would be subverting.

Now, if you developed, say, the liquefaction of coal, if you developed solar energy, if you developed oil shale and so on and make those economically viable substitutes for oil and natural gas, the Exxons and the Gulfs and the Mobils would find that the value of their properties has gone down. They cannot be expected to accelerate the introduction of that technology under those circumstances, and what they have done is to pick off the very coal companies, the very largest coal companies who have the greatest potential for developing that new technology, and for undermining the monopoly control exercised by the petroleum giants in the field of oil and natural gas.

Mr. MOORE. I would like to add a note to that.

Professor Adams and myself have different models of how cartels behave. Basic economic cartel theory works on the proposition that the firms get together, agree on a price, and then each try to increase their production because that will increase their profits.

If you take that model, at the time of the Arab oil boycott with the price increase for oil, one would expect a company which owns other energy resources like coal would in fact try to increase their production of coal to increase their profits. This is the kind of behavior that cartel theory would predict.

The reason in this particular case that this didn't happen is that the Mine Safety Act increased coal costs very rapidly.

Chairman KENNEDY. Let me just at this point interrupt.

We're having the Stevens nomination. I would like to try to come back. You are both, I think, probably among the leading experts on this issue, and I've got some other questions here.

I'd like to ask if you could remain, and I would like to ask Mr. Stewart and minority counsel just to ask some questions on this, if you could stay with us for a little while.

We'll have you out shortly, but it's the give and take—we can file any written questions, but it's the give and take which I think is terribly important for the record. This is an extremely critical issue, I think. And we're going to be dealing with it in the Congress.

So I will ask Mr. Stewart if he could, and I will ask minority counsel, and if there are going to be other members, if we could proceed in that way for a period of time. I want to personally express my appreciation for your coming here and we are going to be following up, weighing this issue closely.

And I want to thank you very much for your presence here.

And I'll ask Mr. Stewart, who is our subcommittee staff member, if he could take the Chair.

Mr. STEWART [presiding]. Thank you, we appreciate your forebearance of this procedure. With me is William A. Cox, who is an economist with the Joint Economic Committee, and George D. Krumbhaar, Jr., who is the minority counsel of the Joint Economic Committee, and my name is John Stewart, and I am a professional staff member with the Energy Subcommittee.

Professor Adams, one question which I think Senator Kennedy was about to ask was that you talked of some form of horizontal divestiture legislation.

Have you any recommendations as to what form this legislation should take?

For example, should Congress focus on specific fuels, such as uranium, where concentrations are particularly severe, or should we be thinking in terms of divestiture across the board?

Are there any alternatives that one ought to be weighing as one thinks in terms of divestiture legislation? I think Senator Kennedy has the view that he very much wants to be not only fair but sensible in this approach, and therefore any guidance you could offer the subcommittee would be very welcome.

Mr. ADAMS. Well, Mr. Stewart, I don't have a draft of a divestiture bill with me this morning, if that's what you're asking for. My inclination is to keep the dominant petroleum firms out, of all competing fuel industries, that would include not only uranium, but it would include coal and the others as well.

You see, the basic model that Professor Moore has suggested, namely, that it doesn't make any difference who the players on a particular team are, as long as there are a certain number and as long as there is no change in their percentage control of the market, in other words, he would say—and correct me if I'm wrong—that it doesn't make any difference who owns Consolidation Coal. It will behave the same way in either case. It will have the same market share before merger as it does after merger.

Now, I submit that that is not so. If I may offer an analogy, suppose you have a basketball game among a bunch of junior high school kids. There are five men on a team. Each has 20 percent, a 20 percent share of the market, and if suddenly a substitution were made for one of those players, and the substitute's name was Kharim Abdul Jabbar, I submit to you that that would make a difference in terms of the competitive outcome. It isn't the same as a little 5-foot 2 player whom Jabbar has replaced. We are talking about——

Mr. MOORE. That's not a fair analogy. We're not replacing Consolidation with Exxon. We are replacing the stock ownership of Consolidation by one group of stockholders with another group of stockholders, and that is more like changing the name of one of your basketball players than changing the basketball player himself.

Mr. ADAMS. It's more than that. You're replacing Consolidation Coal by Continental Oil, and Continental Oil is intertwined and intertied and intermeshed with the other giants of the industry, running a cartel in the oil and natural gas field. And therefore, the behavior of Consolidation Coal under that kind of management will be quite different, the incentives, the payoff matrix, call it what you will, will be quite different once Consolidation has been acquired by Continental Oil than it was before.

It just taxes credulity to suppose that it could be otherwise.

Mr. STEWART. Well, first a question which I think troubles a lot of people.

How do you respond to the argument that concentration ratios in the oil industry are low in comparison to other industries, such as autos and competition levels therefore are adequate?

How should Congress equate the difference between the oil industry, auto industry, aluminium, steel, copper, or whatever?

Mr. ADAMS. Well, Mr. Stewart, I think that's covered in our statement. The major oil companies, now 16 of them, are tied together. They're not independent companies, they're not competing companies. So what you have to do is add their individual market share to one another, and if you do that, if you tie together the combined structure and behavior in this industry, you will find that you have a close-knit, tightly operated cartel in this industry which dominates the industry, horizontally and vertically, and that that control is reinforced, as Professor Moore and I agree, by Government policy.

Mr. STEWART. Thank you.

Mr. Cox.

Mr. Cox. Thank you. I will turn to Professor Moore for a moment. You stated that the day should come when the oil industry dominates the industry market, that the Department can operate under existing antitrust laws as they stand to reverse the trend.

It seems to me it's a very long and uncertain procedure to reverse any trend by going to court under today's antitrust laws. As you see by witnessing the *IBM* case, which is now into, I believe it's the eighth year with no decision anywhere in sight.

Clearly, IBM is far more dominant in the computer field than any oil company will ever be in the energy market. Yet the antitrust laws, while they may ultimately succeed in reversing or altering IBM's dominance, are very, very tenuous and pragmatical types of solution.

Mr. MOORE. The world's leader in the computer industry is the United States. I agree.

Mr. Cox. Certainly.

And would you in light of this, would you support strengthening the antitrust laws if we were to put major reliance on them, and if so, how?

Mr. MOORE. I don't know what you have in mind when you say strengthening antitrust laws.

Mr. Cox. I'm asking you if you really believe, I'm asking you whether you think they're adequate as they now stand, and if there are any measures that you would propose to make them more effective?

Mr. MOORE. I think the Sherman Act is an excellent act. I think if we repealed the Robinson-Patman Act, we could make some real progress. That is the only amendment that I would make to the existing laws, I think the Sherman Act covers the case of monopolization and cartelization very nicely. I see no need for further legislation in this area.

Mr. Cox. Well, let me ask you then about some more selective approaches to suppressing market dominance. Thomas Duchesneau, who you quote in your testimony, made a number of qualifications to a general conclusion that the energy market is more or less competitive.

He wrote, for instance, and I'm quoting:

"Concentration levels in the case of uranium mining and milling suggests the competition is not likely to be effective," and that, quoting further, "significantly, more restricted policy is applicable in the case of oil entry to uranium than is the case of coal."

He concluded: "If oil's penetration into uranium increases antitrust action to achieve divestiture would be required."

Do you buy divestiture in the case of uranium under these conditions or do you see it differently?

Mr. MOORE. I think that under existing circumstances it would be counterproductive. As you are undoubtedly aware, uranium prices have increased very rapidly in recent years, and there is considerable concern in the industry whether there will be adequate supplies of uranium in the future. I think that to discourage companies with large financial resources from going into the uranium business is to retard its growth and development and make us in the end more dependent upon foreign sources of uranium. I think there's a great deal of danger in doing what you have suggested. It might make us worse off rather than improve the situation.

Mr. COX. Well, let me run down a couple more alternatives. I think we'd like to elucidate some of the alternatives that are not as thoroughgoing as outright divestiture of nonoil activities.

Another one proposed by Duchesneau himself is that nonoil entry into competing fuels should be made a clear policy goal. Now just what he means by that I'm not quite sure, but would you accept that as an appropriate policy goal, and if so, how can it be made a policy goal effectively?

Mr. MOORE. I don't know how it could be made a policy goal. I would be happy to see Anaconda Copper get into the coal business, but if General Motors wanted to get into the coal business, that would be fine. I don't see how we can develop a policy to encourage General Motors or IBM or General Electric to go into the coal or uranium business, but if they wanted to enter it, I think they could add some healthy additional competition. I would support it, but I see no good policy mechanisms to encourage it.

Mr. COX. Mr. Duchesneau has another qualification is his proposal that so-called leading firm mergers should be prohibited.

Now if one could define a leading firm somehow, one could prohibit it. But would you agree with that approach?

Mr. MOORE. I certainly would be more sympathetic to that than any kind of divestiture. I would want to discourage any kind of leading firm merger, for example, a purchase by Exxon of the biggest coal company. But I don't think we need any legislation because the Justice Department is already in position to move to block such a merger. If I was to be recommending policy to the Justice Department, I would recommend a very close look at any such merger.

Mr. COX. Well, let me ask one final followup on that. Would Continental Oil, for instance, and Consolidation Coal qualify as leading firms, in your judgement?

I know it's a matter of judgment. Consolidation Coal, for information sake, was and remains the second largest producer. Continental Oil is a considerably less prominent oil company. It is down about 12th or 14th, if I'm not mistaken.

Mr. MOORE. Well, I don't consider Continental Oil a leading oil company. Consolidation Coal is obviously a leading coal company.

Mr. COX. I might say for further information that if you put the two together, they become about the number fourth, fifth or sixth energy company in terms of Btu production.

Excuse me for interrupting.

Mr. MOORE. Well, that doesn't bother me at all. I like to see the 12th, or whatever Continental's position is, in a position to compete with Exxon. That would add to competition. Certainly that is better than having Exxon buying Consolidation Coal. I think in this particular case if anything, it might have had a pro competitive effect.

Mr. COX. Well, in that event this leading firm doctrine, if it were promulgated, would not affect any of the major oil-coal mergers that took place in the late 1960's.

Mr. MOORE. Well, I think that's right. We already have a leading firm doctrine, not written down in the statutes, but the Justice Department and the Federal Trade Commission closely watch mergers, and I have very little doubt that they would move to block what I would consider a leading firm merger in this industry or any of the other industries.

Mr. COX. Professor Adams, did you want to comment?

Mr. MOORE. If, for example, GM bought out IBM, I'm sure there'd be a suit tomorrow blocking it.

Mr. ADAMS. Well, Mr. Cox, I think if we examine the record of antitrust with respect to the petroleum industry, it isn't a very reassuring record. You can start with the Mother Hubbard case in the late 1930's or early 1940's, go down to 1972, when the Antitrust Division tried to get a civil investigation man to investigate potential antitrust problems pertaining to the trans-Alaska pipeline and the Attorney General said, in view of what is going on, this is not the time.

One of the most egregious events in antitrust history occurred in 1957 when 29 U.S. oil companies were accused of using the Suez crisis as an opportunity to raise U.S. gasoline prices. A Federal grand jury was impaneled in Virginia and returned an antitrust price fixing indictment. The case was then transferred to Tulsa, where Judge Royce Savage dismissed all charges against the companies despite the fact that executive diaries showed that telephone meetings had taken place and the companies knew what price levels others were going to invoke prior to the public announcement.

One year later Judge Savage resigned from the bench to become a vice president of Gulf Oil, one of the defendants in the case.

So I for one do not have very much faith in the effectiveness of antitrust in doing something about the energy problem. I think it will require legislation, just as legislation was required to deal with public utility holding companies in 1935. There by law we separated gas and electric properties controlled by holding companies. The Glass-Steagall Act which separated commercial from investment banking, the longstanding public policy which discouraged railroads from getting into the trucking industry, et cetera, recognizing that there is such a thing as intermode or interindustry competition, especially where you're dealing with a concentrated industry, and I think the time has come for the Congress to face up the problem of promoting industry competition, even if nothing is to be done about levels of concentration and monopolization and a lessening of competition in particular industries.

Mr. STEWART. Sir, from the minority side is Mr. George Krumbhaar who is minority counsel. With him is Gary Klein who is a staff member with Senator Javits.

I'm sure they have some questions they'd like to ask.

Mr. Krumbhaar.

Mr. KRUMBHAAR. I would like to ask one question about pricing.

We obviously are asking about a potential monopoly situation where we're dealing with large firms which presumably have presumable market power because of their sheer control of energy resources.

But it seems to me that you need more than control over energy, over alternative energy resources, to affect the kind monopoly power which we want to legislate against. We need to have some sort of structure of price of demand elasticities that would enable these huge energy conglomerates to juggle prices as between one form of energy and another to maximize their profits, and I haven't heard much about elasticity of demand as between coal and oil this morning, and I wonder what your estimates were, both Professor Adams and Mr. Moore.

Mr. MOORE. I've seen some studies for the elasticity of demand for gasoline which indicate the point of elasticity of slightly greater than one. But I'm really in no position to comment on the elasticity of demand for coal. And oil and coal and uranium prices have all changed so much in the last 2 or 3 years that I'm not sure that if you dig out a past study of the elasticity, of demand would have much meaning today any way, if you want to take a fresh look at it, because elasticity, which I think is relevant to what we're talking about, in terms of divestiture, I think is in long run it may be reasonably high, in the short run, it isn't.

A powerplant, if it commits itself to go into uranium, to nuclear power, there's no way for it physically to switch to oil or natural gas or coal, irrespective of what happens to prices after they make that initial decision of the decision to go fossil fuel. It is cheaper to switch from one to another but still it is not costless unless the plant is built to handle more than one kind of fuel, in which case there's more substitute ability. But still a relative amount of substitutability, certainly in the short run between coal.

Mr. KRUMBHAAR. You may say there is or isn't?

Mr. MOORE. In the shortrun there isn't a great deal of substitutability. In the longrun there's a great deal more. But as I said earlier, where a single coal company is owned by an oil company, it just doesn't make sense for the oil company to try to price that coal in any way not consistent with the coal market. The market dictates what the oil-coal producers are charging for their coal or what they can get for their coal.

Mr. KRUMBHAAR. Would you comment on that, Professor Adams?

Mr. ADAMS. Sir, I do not have any exact computation of demand elasticity. I think Professor Moore and I can agree that the demand for energy as such is probably highly inelastic.

What we are talking about here is really the elasticity, the cross-elasticity of supply. That is, the substitutability of one fuel for another, and I think Professor Davidson, who unfortunately is not with us this morning, has answered that question before in the Senate Anti-Trust and Monopony Subcommittee.

If I may quote him, because I agree with his analysis. Professor Davidson said:

> A high substitution elasticity requires independent producers who have no major vested interest in maintaining or improving the capitalized value of oil

crude reserves in the ground. This requires breaking up the conglomerate energy companies in order to permit alternative energy supplies to be produced by independent firms that can have expectations and objectives which differ from the major oil and gas producers.

And then he continues, and I'm skipping now:

A rational producer, observing that one of his actions causes the value of some of his assets to be lowered would not engage in selling that asset and not take that capital loss. On the other hand, if these were independent producers, the fellow producing coal would have no compunction about worrying about posing the capital loss on another industry. And that makes all the difference in the world.

Professor Moore says that Consolidation Coal will behave the same way, whether it's independent or whether it's owned by Continental Oil. That just isn't so. And when he talks about Consolidation Coal being responsive to what the market dictates, I would ask the question who determines what the market does? If you have a competitive market, then you can say yes, the market says, X, Y, Z. But if you have a rigged market, if you have a monopolized market, if you have a cartelized market, you will get quite different behavior among the firms playing the market game.

Mr. MOORE. I would like to make one comment here. To be fair to Mr. Davidson, and I haven't read his prepared statement, but from what Professor Adams quotes he's speaking economic nonsense.

The cross-elasticity of demand depends upon demand characteristics and has nothing to do with whether there's a single supplier or many suppliers, independent or anything else. So his statement, as I understood it, that elasticity of demand depends upon independent suppliers, is patent nonsense.

Mr. ADAMS. He's talking about the cross-elasticity of supplies, as I indicated, so let's be fair to Professor Davidson.

Mr. MOORE. Well, when you're talking about the question that was originally phrased in terms of elasticity, I do not understand it. You said demand.

Mr. ADAMS. That's not so. I said supply.

Mr. COX. I might add that Mr. Davidson's prepared statement is a part of the record of this hearing.

Mr. KRUMBHAAR. I'd like to hear this out a little bit more and see just exactly where the two of you differ.

Mr. MOORE. I want to come back to the example of Consolidation Coal. First I gather that Professor Adams does not believe the coal industry is competitive from what he just said. I guess we differ on that point.

But does he really think that it would make sense for Continental Oil to change the price of Consolidation Coal to benefit the oil industry in which Continental is the 12th largest. This would be more beneficial to Exxon than to Continental.

That doesn't make any sense, even if changing the price of coal could, in fact, affect the oil market. But I think if you just look at these two markets, it's really impossible to visualize how changing the price of Consolidation Coal could affect the oil market in any way that would be noticeable.

Mr. KRUMBHAAR. Well, I don't want to put words in your mouth, Professor Adams, but what you are saying we could do is change the output of Consolidation Coal?

Mr. MOORE. Well, how would that affect it?

Mr. KRUMBHAAR. Well, that is the question I want to ask Professor Adams if my characterization is correct.

Mr. ADAMS. Well, if you change the output of Consolidated Coal—by the way, it's Consolidation Coal, not Consolidated—if you change the output of Consolidation Coal, you do have an impact on the energy market.

More important, if you can somehow retard not only the output of coal, but also the development of coal technology to liquifaction of coal, for example, you buttress, that is Continental and the other oil companies, can buttress and protect their investment in oil and natural gas. They can continue to profit from the shortages from the scarcity of oil and natural gas. They have no incentive, in other words, to undermine the status quo.

Now in order to promote that very possibility, that is to promote competition, if you said Consolidation Coal has no concern whatsoever about the value of oil and natural gas deposits, it seems to me it will behave quite differently than it would if it were tied to an oil company, which it now is.

And the interesting thing is that the major oil companies have not made toehold acquisitions in the coal field. What they have done is to pick off some of the major companies, the most viable companies which have the greatest potential in terms of size, research facilities, and so on, for developing the new technology which will be necessary if we're going to have effective interfuel competition.

Mr. KRUMBHAAR. Are you saying then there's a very real and present danger of a coal shortage caused by oil companies?

Mr. ADAMS. Clear and present danger, I simply——

Mr. KRUMBHAAR. We're talking about the need for legislation, you see, and you don't just legislate in the dark. You legislate because there is the danger that if you don't, something's going to happen, or that it has happened already.

Mr. ADAMS. The danger is if this present trend continues, you see, the incentives are such that coal production is not likely to be increased as rapidly as if the major coal companies are allowed to remain independent. And second, and more importantly, the danger is great that these coal companies which have become captive of the petroleum giants, will not have the same incentive as before to develop the technology which would undermine the established dominant position of the majors in the oil industry.

Mr. MOORE. I would like to make two points. Both are something I've said before but I will state them again. I don't believe that Professor Adams could detect whether Consolidation increased its output by 10 percent or decreased its output by 10 percent you would not be able to detect that in the price of oil.

The second point that I want to make was about innovation and research development. The coal industries traditionally does very little research. I can only think that the oil industry, which has been more active in research and development, by moving into the coal industry, would be beneficial for research and development rather than any hindrance. If Continental Oil could, by using its resources, develop liquification of coal, it would be in a position to profit and it would be highly desirable to do so. Why should it hold back?

Mr. ADAMS. I'll try to answer that, Professor Moore, on the basis of historical experience, all right? This may be responsive to counsel's question about clear and present danger.

Prior to World War II, I. G. Farben and Imperial Chemical Industries entered into an agreement with Standard Oil and Royal Dutch Shell, in controlling the synthesis of gasoline from coal. The I.G.-Standard world hydrogenation cartel promised Standard:

> Ownership and control outside Germany of I. G.'s hydrogenation processes and any future I. G. processes for making synthetically products having similar uses to those of the customary petroleum refinery products from whatever raw material there might be provide.

Stocking and Watkins of the 20th Century Fund concluded in their study Standard's use of its rights:

> Shows clearly that its main object in acquiring them was to strengthen its control over the oil industry. Standard and Shell did little to encourage widespread synthetic development of liquid fuels and lubricants from coal. They had acquired these processes primarily to protect their own vast interests in petroleum.

Standard's aims, according to its own statement, were clear enough, and this is the statement of Standard Oil of New Jersey itself:

> If coal, tar, et cetera, hydrogenation be feasible from an economic standpoint, or if it is to be promoted for nationalistic reasons, it is better for us as oil companies to have an interest in the development, obtain therefrom such benefits as we can, and assure the distribution of the products in question through our existing marketing facilities.

We have a track record on these companies.

Mr. KRUMBHAAR. Well, I have one more question and comment. I would question whether the structure of the coal industry and oil industry were the same then as now? That is my comment. But I have a question also, and this will be my last question. We've talked about Consolidation Coal and Continental Oil and the pattern of coal output as a result of this merger.

I wonder if either of you could inform the subcommittee of the structure of coal production in the Occidental-Island Creek merger? I understand, for example, that coal production has gone up, but there's no evidence of any fall off, and they have been signing major coal contracts.

Mr. MOORE. I have no information on that.

Mr. KRUMBHAAR. You have no information?

Mr. ADAMS. Did you say—I'm sorry, I do have some facts on Consolidation, which I referred to earlier, and there seems to be a very clear decline in Consolidation output.

Mr. KRUMBHAAR. Well, this is one case, I wonder if this is true within every case now making—the other case I know of tangentially is Occidental-Island Creek case.

Mr. ADAMS. I would imagine the figures are obtainable. I don't have them with me.

Mr. STEWART. Mr. Cox, however, does, if he might interject the answer.

Mr. COX. These figures are in a table that Senator Kennedy inserted in the record earlier. They were provided in testimony by Exxon Corp., I believe, before the Senate Anti-Trust Monopoly Subcommittee recently.

It shows that Island Creek was acquired by Occidental in 1968, in which year it produced 26 million tons. Production increased to 30.3 million tons in 1969 and since that time has declined. In 1974 it was 20-plus million tons. The decimal is cutoff of my chart but it was somewhere between 20 and 21 million tons.

Mr. KRUMBHAAR. Well, wasn't there a strike though, here?

Mr. Cox. In 1974, I think that's right, but I'll give you the pattern from 1969 to 1974; 1969 with $30.3 million; 1970 was $29.7 million. The big dropoff was from 1971 to $22.9 million, which could be associated with conditions, but it never recovered. It remained in the $22 million range in 1972 and 1973 and dropped to $20 million in 1974.

Mr. KRUMBHAAR. Well, the Clean Air Act came along in there. I understand they signed a major contract with Japan for that 1984 production.

Mr. STEWART. Mr. Klein.

Mr. KLEIN. I have just a few question on behalf of Senator Javits. The first, Professor Adams, most of the dangers that you see, it seems to me, could be prevented by one of two things, or maybe a combination of the two: Either prohibiting joint ventures, forget the antitrust laws, whether they work or not, just legislation to prohibit joint ventures between competing energy companies. If an oil company has to go into coal, it's not a major inherent advantage unless it can bootstrap itself by gaining access through buying a coal company. And another would be a point you make very well, and the point made about 2 weeks ago very well before the subcommittee by Dr. John Wilson, the difficulty with the joint venture problem and their community of interest, the almost irrelevance to some of the actual numbers in the field because they're all dealing with each other on these joint ventures, and in that sense they all own common interest. If we prohibited the joint ventures, wouldn't that solve a lot of problems that you relate?

Mr. ADAMS. It would help, not solve the problem. I think, too, if you want to do something in the energy field, you have to start with the petroleum and natural gas industries and then ask what the impact of the extension of that dominance and control to other energy areas implies.

In other words, you could take the minimum position, if you want to do nothing about it, oh, yes, you would take the minimum position. OK, fellows, you control these two industries. Enough.

Thou shalt not move on, thou shalt not extend the tentacles of the octopus.

Mr. KLEIN. But oil and natural gas, we're going to run out in 30 or 40 years, according to the National Academy of Sciences. Now where are these multi-billion dollar investment companies going to turn in a better public policy way than to other substitute future energy forms.

Mr. ADAMS. Well, they seem to be having no problem at the present. I mean, Mobil is buying Montgomery Ward.

Mr. KLEIN. Then you criticize them properly, but wouldn't you be forcing them to go into other areas if you don't let them go into alternative energy development on their own?

Mr. ADAMS. I would say in answer that it does less damage to interfuel competition for Mobil to go into Montgomery Ward than it would for Mobil to go into coal or uranium or geothermal or oil shale.

Mr. KLEIN. In that same vein, aren't we losing a lot—what if we made some breakthrough, if we got some hydrogen or methanol or some fuel we could develop for automobile use. Now if we had established what you want us to, wouldn't we force a whole new marketing system throughout the country for auto fuels to be established rather than using existing facilities of the oil industry?

For example, this could happen to home or residential, commercial or anything else, too.

Mr. ADAMS. Well, that depends on what view you take of the vertical structure of the petroleum industry.

That is, for example, I have no objection if an independent marketing company in the petroleum field and independent in the sense that it is not vertically integrated would handle the marketing of a competing fuel.

Mr. KLEIN. Which gets me to my next point, which is, you make a good case for vertical control and the problems that result from vertical control and you come down at the end with the need for horizontal divestiture legislation.

How do you feel about vertical divestiture legislation?

Also Mr. Moore, I'd like to know your views on it?

Mr. ADAMS. I'm in favor of vertical divestiture.

Mr. KLEIN. Well, how does it relate and compare to—we have both of them before the Senate now and I think there's a lot of confusion as to whether they fit together, whether they are complete alternatives, which one would do what?

Mr. ADAMS. They're not alternatives. I think they're complementary. I think they're both desirable.

You see, Mr. Klein, I am an old-fashioned believer in the free enterprise system. I believe markets should dictate to producers rather than producers dictating to markets. I believe that the free enterprise system is most or best calculated to serve the public interest.

Therefore, I am willing to go a long way to make markets function competitively, and if you have a competitively functioning market, I think the public interest is protected. If you do not have such competitive markets, you must devise some alternative safeguards for the public interest. And it seems to me that unless we do something and do something fairly soon to restore competition, or to inject competition into the energy field, what we eventually will end up with is nationalization, which is an alternative that I do not relish, any more than I relish the kind of Government regulation that we have suffered under the so-called independent regulatory commissions in a variety of fields. From the public interest point of view, I believe that competition is the most desirable policy alternative, and it is in the light of that general feeling that I am responding to your questions and other questions this morning.

Mr. KLEIN. Go ahead, Mr. Moore, I'm sorry.

Mr. MOORE. I just want to say that I'm also an old-fashioned believer in free enterprise and the market system and I believe that competition is the best system. I also observe that where markets fail or a monopoly occurs, it is usually because the Government has gotten somehow involved in the market.

I do not believe there's any evidence to indicate that the oil industry, in particular, is noncompetitive. The problem of economics is that

we have no good measures of whether a market is competitive or not. Professor Adams believes this market is not. I look at the evidence in terms of profits, in terms of price behavior, and I conclude that there is no evidence of noncompetitiveness. I believe that markets should be left alone, unless there's clear evidence of monopoly.

Mr. ADAMS. Well, incidentally, you've then changed your mind, Professor Moore, since 1971, where, after analyzing the petroleum industry, you said the result is typical of the cartel-like market.

Now that frankly baffles me.

Mr. MOORE. I guess the additional evidence, the prices and profits——

Mr. KLEIN. Well, hasn't the price been going straight up since 1971? I don't attribute it necessarily to them.

Mr. MOORE. Well, there is the foreign OPEC cartel, has raised prices, but if you look at the long haul, prices have come down.

Mr. ADAMS. Since 1971?

Mr. MOORE. No.

Mr. ADAMS. Have prices come down since 1971?

Mr. MOORE. They have in the last few months.

Mr. ADAMS. Well, from 1971 to 1975 have they come down?

Mr. MOORE. Well, my earlier statement as in the context of prorationing and import quotas.

Mr. KLEIN. Could you, Mr. Moore, comment on the apparent noncompetitive effect of this joint venture community of interest? You quote figures that make sense in terms of number of firms and getting No. 12 to compete with No. 1.

It makes sense in most industries. Does it make sense if all of the top 12 or 16 are in the same pipeline and production facilities together, and does that alter your analysis at all?

Mr. MOORE. Well, I am troubled by the joint ventures and I would support a move to ban joint ventures among the leading oil companies. I think that joint ventures amongst the smaller companies will make them more competitive with the big ones. Therefore, a blanket ban would be undesirable.

Mr. KLEIN. Could you comment also on the vertical divestiture legislation? Are you familiar with that?

Mr. MOORE. I'm familiar with the general proposition and I oppose it, and I see no evidence that vertical integration has harmed competition. In fact, economic theorists are unable to develop a logical mechanism, whereas vertical integration will hurt competition, and there's no evidence that it does so in this case.

Mr. KLEIN. Do you limit your analysis to economic effects? Senator Kennedy was trying to find out whether you thought there was a political effect to the size of these vertical giants.

Do you take that into account or do you just disregard that?

Mr. MOORE. Size is one variable affecting political influence but at the moment it seems to have a negative impact. Large size works against you. Ralph Nader has more influence than the president of Exxon. I am convinced of that.

So it is not at all clear that the oil companies have the influence they used to when Senator Kerr was riding high, the Speaker of the House was from Texas, and the president of the Senate was from Texas. That was a time when the oil industry had considerable influence. I think that time has disappeared.

Mr. KLEIN. Thank you very much.

Mr. STEWART. We're going to try and wind things up in about 5 minutes, but Steve Entin, who is on Senator Taft's staff, has a couple of questions he wants to ask.

Mr. Entin.

Mr. ENTIN. Thank you. I have spent long evenings learning how to differentiate equations and how to string elasticities together, and I can well understand why such analysis is not popular.

But I would like to get back to this point just once because I don't quite understand the transmission mechanism of what you might call the potential monopoly into an actual one across fuels.

Would any one firm be able to restrict output by cutting back on its own coal production, considering the size and structure of the coal industry, with the elasticity of demand for coal and the cost elasticity of demand for fuels and the demand for oil, the elasticity of demand for oil?

Would the price of oil conceivably go up high enough to compensate that particular company for the losses it suffers for cutting back its output in its coal mine, since it would only get a fraction of the benefit of the increase of oil prices? And isn't this the problem in a slightly different sense that Saudi Arabia is facing a let George do it problem? Saudi Arabia is the one that is restricting oil production while Iraq and Kuwait are going busily ahead selling their oil at the higher price that Saudi Arabia's action has given them? Isn't that why Saudi Arabia is cooling to the cartel?

It's the same sort of profit situation that an oil company would face, restricting output in its coal mines. Why would they do it?

Mr. MOORE. In the case of coal mines, you made the point that I was making earlier. In the case of Saudi Arabia I don't believe the facts are quite right—I think Kuwait is also cutting back as well as in fact, Libya has cut back very sharply. But the basic thrust of the argument is correct.

The reason they can get away with this is that they have a very substantial share of the Middle East oil production. In effect, they could be the swing company, or the swing countries, and by their own actions, significantly affect the price of oil.

Now as other producers, Nigeria, Iraq, Indonesia, increase their productions, as North Sea Oil comes in, the dominance of these handful of producers is going to be diminished and the cartel eventually will collapse.

They have already had to cut back significantly. I believe that Libya has cut back on the order of 50 to 60 percent, which is a tremendous cutback in production. I expect this cartel to eventually collapse of its own weight.

Mr. ENTIN. Well, thank you. I certainly hope we can get some elasticity studies on these new points on these demand curves that have not been investigated yet. But Representative Rousselot is here, and we're under a time constraint.

Thank you.

Mr. STEWART. Congressman Rousselot has just arrived and he might like to say a word or two or ask a question, or not. It is certainly his option.

Representative ROUSSELOT. Well, let me collect my thoughts for a minute.

Go ahead if you have other questions.

Mr. STEWART. Well, we have one brief question and we are going to try to wind this up as quickly as we can.

One area which we haven't gotten into yet and I'll just ask a general question, that hopefully both Professor Moore and Professor Adams might give us a brief response to.

Does this large Government funding of research and development increase or decrease future concentration and control over energy technology?

Should guidelines be laid down to prevent public money from putting this technology into the hands of today's majors?

For example, this is an area which is of considerable interest now. There is in the ERDA authorization bill and also the proposed $6 billion of loan guarantees for commercial synfuels projects. President Ford has proposed a $100 billion independence authority.

And so as Congress considers this problem, any advice you might have I think would be welcomed by the subcommittee.

Professor Moore.

Mr. MOORE. As long as the technology could be used either to strengthen big companies or to promote the small company, I think we have to be very careful on how the technology is developed, who does it and how it is disseminated. In the case of uranium enrichment, which I'm a little familiar with, there are several very large companies, not oil companies, that are involved in operating the Government enriching plants and also involved in technology development. Now the problem we have in such enterprises is that a large company will be involved in any case. Since they are not oil companies involved, Government policy is probably correct.

All I can say about the $100 billion energy program is I hope the Congress won't pass it.

Mr. STEWART. Well, there doesn't seem to be any instant affirmative response to that proposal, but that, of course, might change as time develops.

Congressman Rousselot, have you had a chance to gather——

Representative ROUSSELOT. I think so.

Gentlemen, I've only glanced at your statements. Mr. Moore, I notice in your statement you said both the earlier policy of favoring domestic oil producers and the current policy of taxing them is wrong. And then you say the oil industry, if left alone, would be basically competitive, that there is need to break up oil companies or force them to divert to other energy resources.

And then you go on to say the industry can and will react in a reasonably competitive manner if the Government leaves them alone.

Right now, as you know, we have a bill that has just come out of conference.

Have you had a chance to see—which would provide some clear Government intervention—have you had a chance to review some of those provisions? I know it was just announced last week.

Mr. MOORE. I've just seen newspaper reports of the bill.

Representative ROUSSELOT. On the basis of the conceptual things that are described in the newspaper reports, do you think that that bill is constituted and as you understand it would be the best type of intervention?

Mr. MOORE. I would think if I were from Saudi Arabia I would support the bill. But as a U.S. citizen, I think it is very undesirable because it's going to discourage production of U.S. oil. It will, by lowering oil prices here, increase consumption of oil and therefore it's going to work in two ways to benefit the Arab oil producers and the cartel. It will increase consumption of gasoline and oil generally, and it will discourage U.S. production, both of which would work to increase imports and strengthen the Arab cartel. I would think that the bill is basically highly undesirable from our point of view.

Representative ROUSSELOT. Do you find many other people who understand the business or the economics of the oil industry do share your view?

Mr. MOORE. I think most economists who looked at this bill would share my view. I don't say all of them. I would say most all of them.

Representative ROUSSELOT. I tried to preface it by those that have some understanding of the economics of petroleum.

Mr. MOORE. The other ones I talk to feel very similar, very much the way I do about this when I talk to them.

Representative ROUSSELOT. Also in your testimony you mentioned, you bring out the fact that the oil companies' profits have in fact dropped in recent quarters, showing signs that the competition is present.

Do you believe that if Congress were to provide so-called rollback provisions, plowback provisions of revenues toward development—a generation of new exploration, would in fact that improve in your judgment if Congress acted that way, under the tax provisions, would that in fact improve the lessening of dependence on foreign sources?

Mr. MOORE. I'm worried with this kind of provision. The ICC has imposed on railroads the same kind of provisions for investing in rail boxcars, and in some cases it has worked to diminish the number of cars bought rather than increase the number, but in any case, it hasn't helped the boxcar shortage. This kind of regulation, internal regulation, of an industry is almost inevitably going to produce inefficiencies. It's going to produce higher costs rather than lower costs. I can only reiterate the point that Professor Adams made earlier about the market. I don't think that we sitting in this room or the Congress legislating can decide on the appropriateness of investments in exploration and development.

Representative ROUSSELOT. Well, as you know, some of the Members of the Congress both in the House and the Senate have felt that this might be an alternative to other provisions that have been recommended by higher levels of Government regulation. That is, to provide the tax incentives.

What kind of incentives do you think that Congress can provide if they can to encourage a greater development of our potential petroleum resources, say offshore?

Mr. MOORE. Well, I think that providing a free market would be best. I would be against such things as going back to the oil depletion allowance. The studies that were made on that indicate that they were extremely inefficient in terms of the extra oil produced and all of the taxes lost. I think the free market is the answer to offshore oil. We do have a licensing problem. The Federal Government has to license exploration and environmental considerations have to be considered.

I think a vigorous but careful expansion of leasing would help. I really see no longrun need for us to particularly foster U.S. oil as opposed to foreign oil. I am against increasing dependence of foreign oil as the bill that is just coming out of the conference committee would do. But I'm also opposed to deliberate actions to make us less dependent on foreign oil.

In the long run we can buy a lot of cheap oil from abroad and frankly, we get it without the ecological headaches of pumping it out of the ground.

Representative ROUSSELOT. Mr. Adams, do you want to comment on the same subject?

Mr. ADAMS. No, Mr. Rousselot, I commented on that this morning.

Mr. STEWART. If Senator Kennedy were not participating in the confirmation hearings for Judge Stevens, he would also be offering his thanks to both of you for coming, and in both cases from considerable distances, to be here this morning. It's been a very useful hearing and I'm sure the subcommittee will gain a great deal from it.

If there are no more questions, the subcommittee will stand adjourned. Thank you very much.

[Whereupon, at 11:40 a.m., the subcommittee adjourned, subject to the call of the Chair.]

APPENDIX

STATEMENT OF DEWITT W. BUCHANAN, VICE PRESIDENT, OLD BEN COAL CO., BEFORE THE SUBCOMMITTEE ON ANTITRUST AND MONOPOLY, SENATE JUDICIARY COMMITTEE, OCTOBER 21, 1975

My name is DeWitt W. Buchanan, and I am appearing today on behalf of Old Ben Coal Company of which I am the President. Old Ben is headquartered in Chicago, Illinois and operates mines in Illinois, Indiana, and Virginia. As the result of a merger in 1968 between Old Ben and The Standard Oil Company of Ohio ("Sohio"), Old Ben is now a division of Sohio. I am currently a Director of Sohio and have been since April of 1969.

I'm here today to talk about the coal business because that is what I know. I grew up in the coal business; I've always been in it, and I always will be. I understand that you have heard from a lot of different witnesses during these hearings, but as far as I could determine, you've not heard from anybody who's actually devoted his life to coal. I appreciate this opportunity to tell you something about the facts of life in this industry, past and present. I would also like to make some suggestions on what the government can do to help with the future development of coal in this country.

The Coal Industry.—The United States is blessed with very extensive coal reserves as illustrated by the map of Exhibit I; some of these reserves are well located with respect to coal markets and others are not.

A recent publication of the U.S. Bureau of Mines entitled "Demonstrated Coal Reserve Base of the United States on January 1, 1974", states that this country has 434 billion tons of demonstrated coal reserves. Assuming conservatively that 50 percent of these reserves are economically recoverable with today's technology, this represents a future coal supply of over 200 billion tons. To put that into the proper perspective, the current rate of U.S. coal production is approximately 600 million tons per year. At that rate of production, the United States has approximately 350 years supply of recoverable coal. Even if our annual production rises substantially, we have a lot of coal by any standard of measure. Stated another way, these coal reserves on a BTU basis are equivalent to almost one trillion barrels of crude oil. This far exceeds the estimated U.S. crude oil reserves of around 36 billion barrels.

The coal industry is made up of 4,000 operating companies of different sizes. In 1974, the largest company, Peabody Coal, produced 68 million tons of coal, or slightly more than 11 percent of the total production. During that year, 72 other companies had production in excess of one million tons. Additionally, 524 coal companies had production between 100,000 and one million tons. Over the last eight years, the sales of the 50 largest coal companies have fluctuated between 65 and 70 percent of the total industry's sales.

Over the years, a number of companies have entered the coal business and others have disappeared. There's nothing mysterious about this. As in any competitive industry, whether a specific company is able to survive and grow or not is a function of such facts as the quality of its personnel, how efficiently it invests its capital, and the quality and location of its coal reserves.

Historically, the health of the coal industry has been largely dependent upon factors which were beyond the control of the coal companies themselves. In 1940, the consumption of coal was heavily reliant upon use for home heat, railroad fuel, and the manufacture of coke. This can be seen on Exhibit II. In order to have an assured coal supply for coke production and other uses, many steel companies operated their own mines then and still do.

Following World War II, the rapid development of U.S. oil and gas production began to catch up with the coal industry. Due to the development and acceptance of the diesel locomotive, the percent of domestic coal consumption

going to the railroad industry declined from approximately 22 percent in 1945 to less than 4 percent in 1955. (See Exhibit III.) By 1960, the railroad market for coal had essentially disappeared. Today, coal is not used in the transportation market at all.

Since the price of natural gas has been held below its true fuel value by price controls, and since petroleum products have been readily available, a major portion of the home heating market has shifted from coal to these cleaner and more convenient fuels. In 1950, 84 million tons of coal were used to heat homes. By 1974, home heating consumption of coal had declined by 90 percent to only 9 million tons.

Even though the U.S. demand for energy was growing rapidly during the 1950's and 1960's, the portion of that demand supplied by the coal industry was declining. Based on U.S. Bureau of Mines data, coal represented around 35 percent of the nation's total energy supply in 1950. By 1970, coal's contribution to the U.S. energy supply had declined to slightly less than 19 percent. The coal demand by the steel industry and a portion of the developing demand of the electrical utility business was all that kept the coal industry going.

The supply of coal to the utility industry has increased from 49 million tons, or 11 percent of total coal consumption in 1940, to a level of 388 millions tons in 1974. The latter figure represents 70 percent of the total U.S. coal consumption in 1974. This apparently rapid growth in the demand for coal by the utility industry is very deceptive because the utility industry itself has been growing at a much faster pace.

Coal represented over 75 percent of the total fuel consumed in electricity production during the 1940's. This share of the utility market has been eroded to about 53 percent in 1974. Several factors have contributed to coal being squeezed in this market. Foremost among them has been the availability of cheap natural gas, and what I call dump priced imported residual fuel. When the import restrictions on very low priced residual fuel were lifted in 1966, large numbers of formerly coal-fired utility plants along the Atlantic Coast converted to residual fuel. Additionally, during the 1960's many utilities were reluctant to construct coal-fired facilities because nuclear power was being viewed as the fuel of the future in electricity generation.

Prior to the last two years, the wide availability of cheap natural gas and low cost imported residual fuel have enabled the utilities to more or less dictate coal contract terms. The Tennessee Valley Authority, for example, being the largest coal purchaser in the country, had the economic power to secure preferential pricing.

The continued regulation of natural gas prices at unrealistically low lovels has caused an increase in demand for natural gas and has discouraged the development of additional supplies. Therefore, in the last few years, the availability of natural gas has fallen short of demand. Additionally, the cost of petroleum products has increased dramatically due to the pricing actions of the OPEC nations. These factors, coupled with a heightened concern over our growing reliance on imported oil, have brought the coal industry's potential back into focus. Coal is being called upon to play a major role in increasing the nation's energy self-reliance. A widely-accepted goal is to at least double coal production by 1985.

The coal industry is more than willing to strive for that goal, but as in the past, the attainment of that goal is largely dependent upon forces outside of the industry's control.

As I pointed out in my discussion of the coal industry's history, both the transportation market and the home heating market have essentially been closed to coal. The utility industry represents the only portion of the energy market that can greatly increase its use of coal. This is in terms of both new facilities and the conversion of existing facilities which currently consume oil or gas. The extent to which coal can further enter this market is dependent upon the utility industry's capability to finance these expansions and conversions.

Additional external factors which have come about recently are also tending to inhibit the further development of the coal industry. These include the National Environmental Policy Act and the Federal Coal Mine Health and Safety Act. Please don't misunderstand. I am not against the good intentions for which these laws were designed. What I am against is the arbitrary manner in which they are being interpreted and enforced. They were well conceived measures, but they are currently being over-used and abused, as I will discuss more fully later.

From these brief remarks, I hope you will understand that the coal industry has been characterized for many years by three things: an abundance of reserves, the involvement of many companies, and the impact of what I have called external factors.

The History of Old Ben.—Having mentioned some of the significant characteristics of the coal industry, let me turn to Old Ben itself and its relationship to Sohio.

Old Ben has been in the coal business for a long time. We are currently in our one-hundredth year of business. I'm very proud of that! Even though Old Ben was a public corporation prior to the merger with Sohio, it was family controlled. This company was founded by my grandfather. My father spent his entire career at Old Ben. I started with the company in 1940, and since then I have been involved in every single part of this business.

Over these one hundred years, we have developed a very good business reputation. This is important not only to our ability to market coal, but also in attracting top quality employees. One of the things I insisted on in the merger with Sohio was that Old Ben maintain its own identity. It has, and almost all of my key employees have come out of the coal side of the business.

At the present time, Old Ben operates three deep shaft mines in Illinois, one underground mine in Virginia, and two large surface mine complexes in Indiana. We are just bringing on stream a new large Indiana surface mine. In addition, we have commenced shaft sinking of a two mine deep complex in southern Illinois.

Incidentally, our current plans for the new Illinois deep mines involve a capital expenditure of $80 million, exclusive of the coal lands cost. This is about $18 per annual ton of capacity. Twelve years ago we brought in a new coal mine in Illinois that entailed a capital expenditure of $12 million, also exclusive of the coal lands cost. That amounted to $4.60 per ton of annual production. As you can see, capital costs for coal mine openings have expanded fourfold over the 1965 to 1975 period.

Old Ben currently employs about 2,400 people at our mining operations. The expansions I have just mentioned will add another 1,450 in the next five years.

During the mid-1960's, we were looking for an opportunity for diversification in both Old Ben's geographical area of operation and its type of coal product. We were also looking for some step which would enable us to grow more rapidly in the coal industry. When Sohio approached us, therefore, we were interested. We felt that Old Ben would benefit from a merger with a relatively large, diversified and financially strong company like Sohio. In addition, I had a personal interest in Sohio's research and engineering, particularly the research it had done in the 1950's with respect to converting coal into synthetic fuels.

As far as Sohio's viewpoint is concerned, I understand that in the mid 1960's, their projections of energy supply and demand for the United States indicated that there would be a shortage of total energy during the decade of the 1970's. Their forecasts indicated that the production of crude oil in the United States would peak out some time between 1972 and 1974.

Sohio had long been a crude oil deficient refining and marketing company. At that time they were refining approximately 160,000 barrels of crude oil per day and their domestic crude oil production was in the range of only 30,000 barrels per day. Their previous efforts to improve this crude-deficit position had not been very successful.

Given this situation, Sohio's management was quite concerned about any opportunity for continued growth possibilities in the future. Therefore, in planning for the future they decided that if there was going to be a severe shortage of fuels, then other fuels should be good business for them to be in. This was particularly true of the one fuel which the United States had tremendous reserves, namely, coal.

Sohio felt that the only way they could enter the coal business would be to acquire a well-managed, medium sized coal company which had sufficient reserves for expansion and was reasonably profitable. The main guideline was that the company had to be technically competent and well managed.

In terms of reporting relationships, before the merger with Sohio, I was President of Old Ben Coal. I still am, and I am now on Sohio's Board of Directors. While I report to Sohio's President Al Whitehouse, the operation of Old Ben is essentially under my direction. Sohio has provided me with legal, financial, and environmental assistance, but basically I have coal people running my coal business. The coal business was exciting to me before the merger, and it still is.

To be perfectly plain, Old Ben is not treated like a poor stepchild when it comes to getting capital to develop and expand its business. If I have a capital project which appears to be profitable, I get the funds I need for that project.

Old Ben's coal production has not been restrained by my friends at Sohio. In fact, I constantly get strong encouragement and support to produce as much coal as possible, because Old Ben's recent profits have added important support to Sohio's major financing efforts to develop Prudhoe Bay and construct the Trans-Alaska Pipeline.

Old Ben's coal prices have not been manipulated to support Sohio's oil prices. I have as much control over my prices as the competitive coal market will allow. In terms of operating authority, I can make any coal sale up to $5 million without even notifying Mr. Whitehouse. I don't need higher approval for any coal sale unless the total revenue resulting from that sale exceeds $10 million. As you can see, I have a lot of latitude in this area.

I've touched on a number of the real plus factors in Old Ben's association with Sohio. In doing so, I guess I am disagreeing with some of your concerns.

Competition—Coal Versus Petroleum.—I understand that one of the major things that worries this Subcommittee is the potential decrease in competition which might result from individual companies producing more than one form of energy. I personally feel that this concern is unwarranted, particularly in regard to petroleum products and coal.

I suggest that you consider the various markets served by petroleum products and coal, as well as the normal method of sale. These factors will confirm that coal is in extremely limited competition with petroleum products, regardless of production ownership.

Take a look at the transportation market. It's not surprising that this has become the exclusive domain of various petroleum products. In fact, about 56 percent of all refined petroleum products is consumed in highway, air, water, or rail transportation. Coal had been a significant factor in the railroad portion of the transportation market, but this market for coal had disappeared by 1960.

Approximately 18 percent of petroleum products end up in the home heating market. By 1974, less than 2 percent of the bituminous coal consumed in this country was used for home heating, and this percentage was continuing to decline rapidly. A substantial number of the new houses which have been constructed over the years have heating systems based on natural gas or electricity. These installations are designed such that it would be impossible to convert them into coal. With the convenience and cleanliness inherent in the use of petroluem products and natural gas for home heating, I find it difficult to believe that the few home owners who could convert their furnaces back to coal would do so as long as they can get natural gas or heating oil.

Both petroleum and coal can be converted into coke. This application represents 16 percent of U.S. coal consumption as opposed to less than 2 percent of refined petroleum products. However, these two types of coke serve entirely different markets. Coke produced from coal is used exclusively in the production of ferro-metals. Generally, petroleum coke is converted into high purity electrodes that are used for, among other things, the refinement of aluminum. Consequently, there is no overlapping market for these types of coke.

Eight percent of refined petroleum products goes into either petro-chemicals or asphalt. Coal does not have the physical characteristics needed for asphalt and the amount of coal consumed in chemical production is insignificant. Again, there is no overlap of markets in oil and coal used for these purposes.

A minor amount of refined petroleum products, namely 3 percent, is consumed as a boiler fuel in the industrial market. While industrial boiler fuel consumption of coal had been a very significant market until the mid 1960's, it has been dwindling since then. Due to the relatively high cost of air emission control devices necessary to meet environmental regulations, many industrial firms, particularly the smaller ones, have found the continued use of coal to be uneconomical. By 1974, industrial use of coal had declined to less than 12 percent of total coal consumption compared to the mid 1960's level of around 25 percent.

The only significant area of consumption served by both coal and petroleum products, specifically residual fuel, is the electrical utility market. By 1974, over 70 percent of the bituminous coal consumed in this country went to electrical utilities. Residual fuel sales represented 16 percent of U.S. petroleum product demand in 1974 and over 60 percent of this residual fuel was not produced here but was imported from overseas. That portion of residual fuel sales and the small

amount of distillate fuel sales going to the electrical utilities in total represented 9 percent of refined petroleum product demand in 1974.

Even in the utility market, competition between coal and residual fuel is limited by geography, technology, and method of sale. The residual fuel used by utilities is essentially limited to the New England states, the Mid-Atlantic states, and the West Coast. This had been the result of a growing reliance over the years prior to the Arab embargo upon low cost imports of residual fuel.

Utility plants are very costly to construct. Therefore, the furnaces are typically designed to burn one type of fuel. In most cases, once a plant is constructed, it no longer acts as a market for fuel types other than that for which it was designed, unless extensive capital modifications are undertaken.

Since residual fuel is the product of a manufacturing step, it can be produced from a variety of refineries and still meet the same specification. Therefore, those utility plants which burn residual fuel can enter into short or intermediate term contracts, with some assurance that when the contract terminates, suitable residuals can be obtained from another refiner, if necessary.

This is not the case with coal. Each area of coal reserves has its own physical characteristics. Coal produced from one mine, while being perfectly suitable for use at one utility plant, may be completely unacceptable at another. Hence, the majority of coal sold to utilities moves under long term contracts which might last for the life of the mine. One of the objectives of the utility plants in doing this is to avoid costly equipment modifications which coluld be required every time a short or intermediate term fuel contract expires.

Typically, a utility planning to construct a coal-fired plant will issue specifications on the volume and type of coal required and the plant location. In the case of Old Ben, if we have reserves of the type required within a reasonable geographic distance from the consuming plant, we would attempt to negotiate a supply contract. Our success in winning this contract would depend upon our abilty to supply an acceptable specification product at a lower cost than our competition. This is a direct function of how efficiently we are able to mine coal. If we do enter a contract, then we would construct a mine and essentially dedicate its production to that particular customer.

I would estimate that approximately 75 percent of the coal sold to electrical utilities is under long term contract. That coal which is not sold under long term contract moves in what is generally known as the spot market. Here competition among coal companies is very intense. Both the supply and demand for coal in the spot market are dependent upon general economic conditions. During recessions such as the current one, the amount of coal moving into the export market declines due to slackened demand. Therefore, more uncommitted or spot coal becomes available. However, demand for spot coal also is down. Recently, my sales department has been crying on my shoulder every day because they are finding it very difficult to sell uncommitted coal.

When economic conditions improve, export volumes increase and less coal is available for the spot market, just at the same time as demand for that coal increases. That is why spot coal prices fluctuate so much, compared to contract prices which remain relatively stable over long periods of time. This can be seen on Exhibit IV.

S. 489.—The bill that this Subcommittee has under consideration, S. 489, would prevent companies within the petroleum industry from engaging in the development of other forms of energy. In doing so, it would force petroleum companies to divest themselves of their coal interests. This would result in a major structural change for some coal companies. Structural change of a company or industry without proof of a need for change or a consideration of what will really result doesn't make a great deal of sense to me.

I disagree wtih the thrust of S. 489 because it appears to be directed toward imaginary problems related to "potential" limts to competiton between energy forms. I believe that these problems just do not exist. As I have indicated by discussion of the relationship between Old Ben and Sohio, Old Ben's coal production has not been held down by Sohio to stimulate demand for petroleum products. In fact, our coal production has increased substantially. Nor has Sohio attempted to manipulate Old Ben's coal prices.

I feel that enactment of S. 489 would not change the limited nature of competition between coal and petroleum products. What it would do is disrupt the widelv recognized efforts to increase all forms of domestic energy production, including coal, because it would eliminate the positive aspects of petroleum company ownership of coal operations.

Look at what has taken place at Old Ben since its merger with Sohio. Since 1969, Old Ben as part of Sohio, has committed $155 million for development, coal reserves and surface land, and physical plant and equipment. During a similar time period immediately prior to the merger in 1968, Old Ben had made capital expenditures equal to about $30 million.

During the five-year period from 1964 through 1968, Old Ben's annual coal production had averaged a little over 8 million tons. Since 1969, Old Ben's coal production has averaged over 11 million tons per year. The two new mining complexes we have under development will produce 7.5 million tons annually.

The real question is whether coal production would expand faster if oil companies were ordered to divest their coal interests. I think just the opposite would be the case. There would be expansion but very likely it would be at a much slower rate. Let me speculate on what might happen if Old Ben were divested. With construction costs going up so rapidly, it is obvious that financing has become a critical factor in expanding coal production. Coal companies can normally offer lenders the security of known coal reserves and of a market for coal by means of long term contracts. However, developing a mine is a risky business. Therefore, lenders normally require the additional assurance that the mine will, in fact, be completed and kept in operation until the loan is repaid. If a mine shaft fails, for example, another one must be sunk. In our case, Sohio provides this guarantee to the lenders.

If we become a separate company, we could provide such guarantees to the limit of our financial ability. However, this would slow down our rate of expansion until we became larger as time passed. We would probably have to pay for mines by selling stock in the company, and this is an expensive way of financing such a development. In any case, in the near term, we could not expand at a pace which would allow us to contribute our share to the goal of doubling coal production in the next decade.

Consequently, I feel that enactment of the legislation which you are considering would simply disrupt a well organized effort to increase coal production. I do not feel that restructure of the industry would accomplish anything in a positive sense. S. 489 simply does not address itself to the real problem of the coal industry. I would like to comment on several things that do cause a problem for this business.

Our current environmental regulations are designed to limit the amount of pollution entering our air and water. Obviously, there are a number of ways that this can be accomplished. Unfortunately, in regard to air emissions, the regulators have insisted upon artificially imposed restrictions which must be met at all times. In doing so, they have ignored the limited availability of technology to meet these restrictions, the costs involved, or whether intermittent controls which operate only when required by climatic conditions would be more appropriate. These artificial restrictions must be loosened in the short run if the coal industry is to provide a greater portion of this nation's energy supply. Congress must restore a proper balance between the needs of the economy and the needs of the environment.

Similarly, the Coal Mine Health and Safety Act (CMHSA) has had a very adverse impact on coal production without a commensurate increase in safety. Since this law was passed in 1969, the productivity of underground mining has been reduced by as much as 45 percent. I wish that the coal industry and the people administering CMHSA could work cooperatively to improve safety without substantially decreasing productivity. However, the manner in which CMHSA is being interpreted and applied is inhibiting progress towards achieving the intent of the Act.

One of the major steps necessary to increase coal production in this country is to engage in applied research on mining techniques which will improve coal productivity with increased safety. Yet the rigid interpretation of CMHSA that is being applied by the Interior Department has all but precluded such applied research. The coal industry-supported research organization, Bituminous Coal Research, is currently being reorganized to provide leadership in an effort to correct this situation.

As I said earlier, I'm for measures which improve mine safety, but I'm against the current interpretation of CMHSA which is holding down the production and use of coal. Now Congress has had a say in enacting this law, and I believe it can have a say in how it should be interpreted.

If you are interested in how to encourage greater coal production, I have the following suggestions to offer:

1. The coal industry must be allowed to attract the capital needed to expand coal production. Estimates of the amount of investment required to double coal production between now and 1985 have ranged from $15 billion to $20 billion. Generating that much capital is going to be quite a challenge to the industry. I don't feel that the coal industry should be assisted in attracting this capital through either federally guaranteed prices or federally guaranteed loans. At the same time, capital formation should not be hampered by barriers designed to keep specific segments of the economy out of the coal business. The more companies that enter this business, the more capital there will be. Coal production should increase accordingly.

2. Research and development in the coal industry should be strongly encouraged and federal funding should continue. I realize that a great deal of research is being done on the liquifaction and gasification of coal. Economically feasible synthetic fuel processes are important but will be of little value if the coal they need for feedstock is unavailable. The critical research required is on how to increase productivity in existing and future coal mines. New underground mining methods have to be developed to supply the feedstock for these synthetic processes.

3. A viable federal coal leasing program must be established which will allow a business-like development of western coal. In order to allow the smaller operator to participate in this development, bonus bidding for these leases should be replaced by royalty bidding. I personally feel that the Interior Department is headed in the wrong direction in some of its proposals with respect to the development of these coal lands. I am opposed to a program such as the IMARS program proposed by Interior which dictates what shall be leased and by whom.

4. A realistic means of complying with NEPA must be established so that the increased production and use of coal can proceed without undue delay or restraint. The amount of time involved preparing environmental impact statements and getting them approved, usually through judicial review, must be shortened. The current procedure delays both the opening of new mines and the siting of coal-fired plants.

5. The Clean Air Act amendments which have been proposed by the President should be enacted.

6. No federal reclamation legislation should be enacted which is so unreasonably stringent that it precludes the surface mining of western lands. Reclamation has become a well established practice by the responsible elements of the coal industry. Additionally, the individual states have developed reclamation policies designed for their own lands. A federal program which attempts to deal with wide variations in topography in a uniform manner would not be redundant but would severely retard coal production.

7. Methods to improve and expand coal transportation facilities should be taken into consideration. Significant expansions of coal production will require a healthier transportation system than the one that exists today.

8. Oversight hearings should be conducted on the Coal Mine Health and Safety Act. In particular, the provisions pertaining to the assessment of fines and judicial review need attention. The time and effort presently involved by both Government and management on account of these provisions of the Act could better be devoted to actual efforts to achieve safety and productivity.

A Final Word.—I would like to make one final point here today. I understand that various witnesses who have appeared before this Subcommittee have implied, without adequate factual justification, that there is little competition within the petroleum industry due to joint ownership of facilities, alleged interlocking directorates and the like. I came into this industry as a complete outsider seven years ago. I've been a member of Sohio's Board of Directors for the past six years, and I'm happy to say if Sohio's operations are typical, these allegations are simply not true. These unsubstantiated assertions do a disservice to the companies working to meet the energy needs of the nation.

Thank you for the opportunity to appear before this Subcommittee. I shall be happy to respond to any questions you may have.

EXHIBIT I

Coal Reserve Areas in the United States

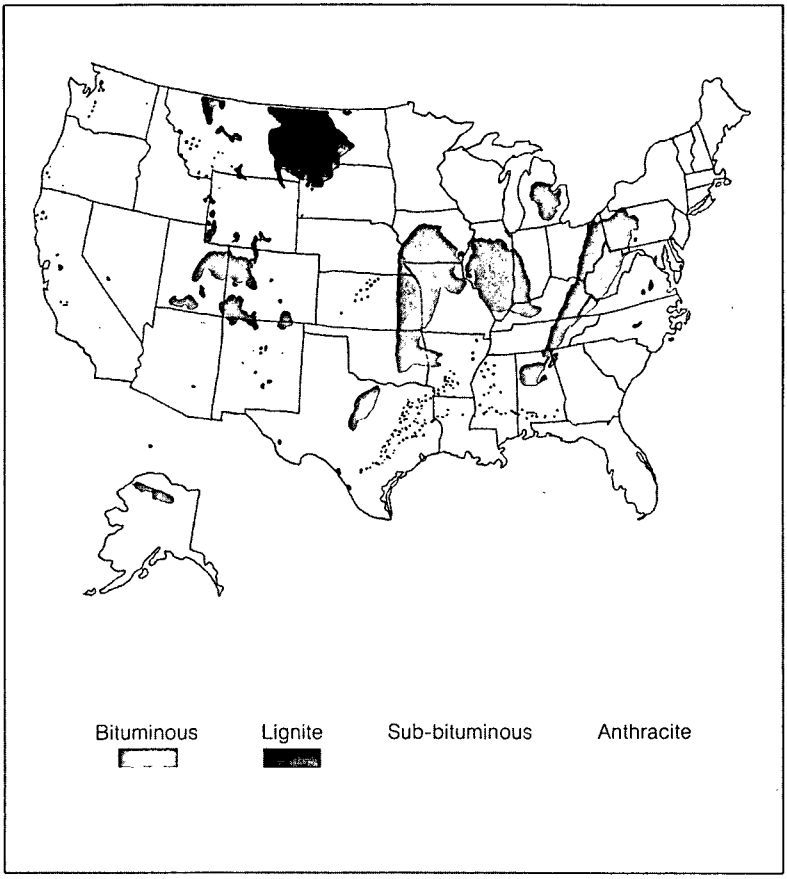


EXHIBIT II

U.S. CONSUMPTION OF BITUMINOUS COAL FOR SELECTED YEARS

[In millions of tons]

Year	Railroads	Electric utilities	Coking coal	Other industrial	Retail deliveries	Total
1940	85	49	81	131	85	431
1945	125	72	95	149	119	560
1950	61	88	104	117	84	454
1955	15	141	107	107	53	423
1960	2	174	81	93	30	380
1965		243	95	102	19	459
1970		319	96	89	12	516
1974 [1]		388	90	64	9	551

[1] 1974 figures are preliminary.

Source: "Bituminous Coal Data," 1974 edition, published by the National Coal Association, p. 83.

EXHIBIT III

U.S. CONSUMPTION OF BITUMINOUS COAL FOR SELECTED YEARS

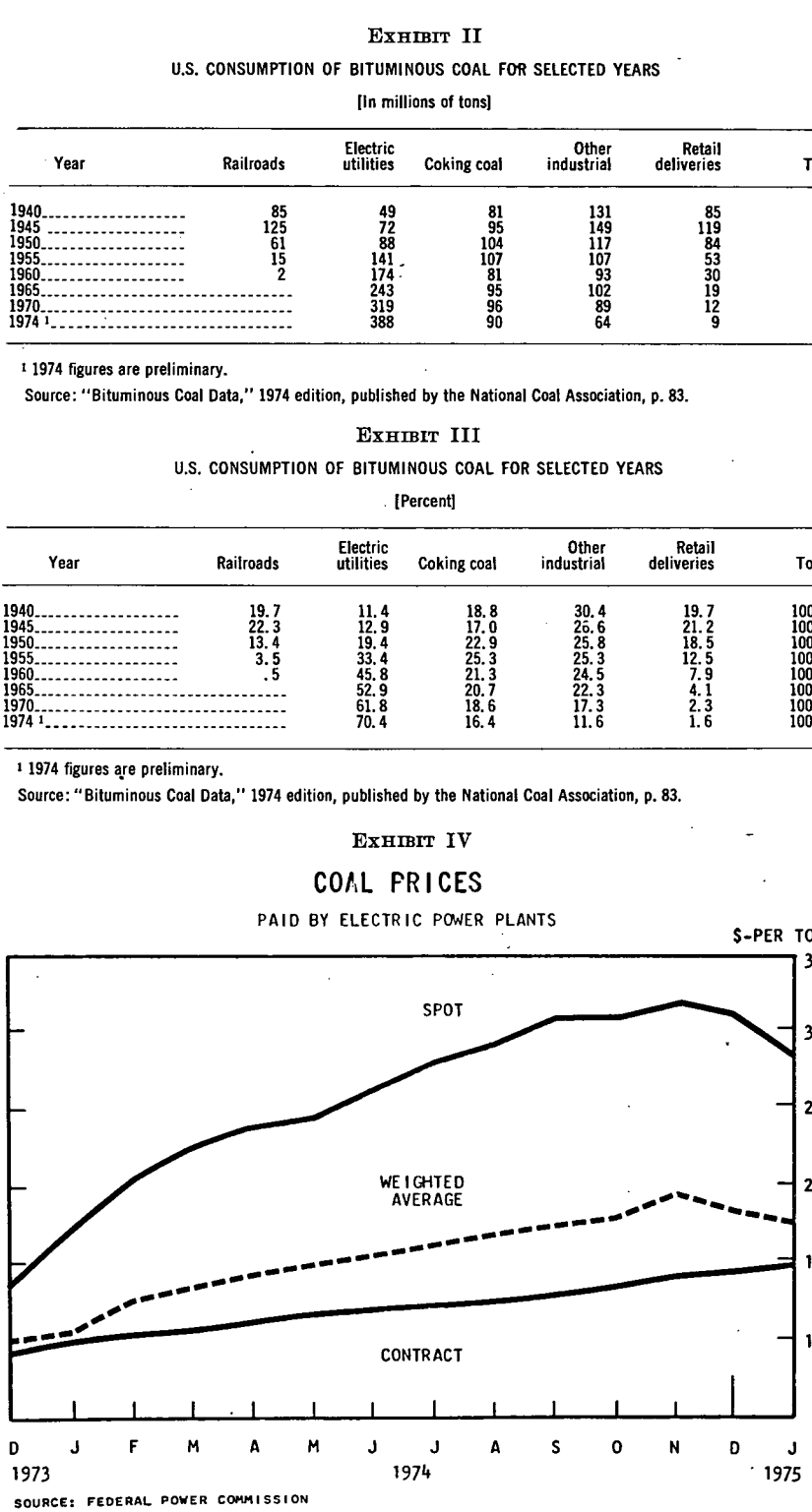
[Percent]

Year	Railroads	Electric utilities	Coking coal	Other industrial	Retail deliveries	Tota
1940	19.7	11.4	18.8	30.4	19.7	100.0
1945	22.3	12.9	17.0	26.6	21.2	100.0
1950	13.4	19.4	22.9	25.8	18.5	100.0
1955	3.5	33.4	25.3	25.3	12.5	100.0
1960	.5	45.8	21.3	24.5	7.9	100.0
1965		52.9	20.7	22.3	4.1	100.0
1970		61.8	18.6	17.3	2.3	100.0
1974 [1]		70.4	16.4	11.6	1.6	100.0

[1] 1974 figures are preliminary.

Source: "Bituminous Coal Data," 1974 edition, published by the National Coal Association, p. 83.

EXHIBIT IV



AN ECONOMIC ANALYSIS OF PRICE INCREASES IN THE U. S. COAL INDUSTRY

Prepared for:

American Public Power Association
Emergency Committee for the Tennessee Valley
National Rural Electric Cooperative Association
Tennessee Valley Public Power Association

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AN ECONOMIC ANALYSIS OF PRICE INCREASES IN THE U. S. COAL INDUSTRY

I. Introduction

The purpose of this report is to document the rapid increases in the price of all types of coal produced in the U. S. and to investigate possible causes of these increases. Coal is a primary fuel used to drive the nation's economy and to provide a source of power for the generation of electricity. Due to shortages in oil and natural gas, the traditional substitutes, the nation will become increasingly dependent upon coal, which is relatively abundant. Increases in the price of coal, therefore, have and will continue to have far-reaching effects into every segment of the U. S. economy, particularly on the cost of generation of electric power, for utilities typically consume more than 65 percent of the Bituminous coal produced in the U. S.

In the second section of this paper, increases in coal prices are reviewed and trends in production in coal mining are surveyed. Although some of the price increases can be explained by increased costs of production, it appears that the supply response of the coal industry to a rapid rate of price increase cannot be justified on the basis of cost increases alone. In a competitive environment, one would typically expect a rapid rate of price increase to lead to substantial increases in

industry output. This has not occurred. Rather, output has remained virtually constant over time and operating profits from coal have increased tremendously. The third section contains a study of profits from coal operations which indicates that price increases have been accompanied by substantial increases in profits. Section IV provides an overview of increasing economic concentration of U. S. coal production and resources. Coal companies have, since 1967, been the target of acquisitions and mergers. Oil companies, which are also involved in the production of natural gas, have been particularly active in obtaining ownership or operating control of coal firms. Thus, there has been increasing concentration in the energy sector, not just in coal production alone. The last section contains a summary of the major findings and the conclusions.

II. Coal Prices, Production, and Consumption, 1955-1974

The price indices compiled by the Bureau of Labor Statistics of the United States Department of Labor are an important source of information on the average price movements of coal. These indices are available for various types of coal, including Metallurgical coal (both High and Low Volatile) which is used principally in the production of coke, Bituminous coals which are used by electric utilities and other industry for the generation of steam, and Anthracite. The price indices are derived from actual prices charged in the spot market (f. o. b. cars at mine) by coal producers throughout the country to coal consumers. Indices, unfortunately, are not available on a regional basis. In any case, data on prices for the years 1955 through the first six months of 1974 are reported in Table II. 1.

TABLE II. 1

Price Indices for Various Types of Coal
by Year, 1955-1974
(1967 = 100)

Year	Bituminous Coal		Anthracite	Metallurgical High Volatile	Metallurgical Low Volatile	All Coal
	All	Industrial Screenings				
1955	80.9	80.0	94.6	N.A.	N.A.	82.3
1956	89.4	89.7	97.0	N.A.	N.A.	89.8
1957	96.8	98.1	107.2	N.A.	N.A.	97.6
1958	95.5	95.9	107.0	97.2	97.8	96.5
1959	95.0	93.1	108.7	96.2	95.2	96.2
1960	94.4	92.1	107.5	96.3	94.2	95.6
1961	93.8	91.2	103.0	95.7	94.1	94.6
1962	93.0	90.8	101.4	95.6	93.9	93.7
1963	92.9	90.9	103.3	95.6	92.2	93.8
1964	92.7	91.9	105.7	96.4	91.7	93.8
1965	92.7	91.8	100.9	96.8	92.3	93.4
1966	95.1	94.8	99.6	98.4	97.0	95.5
1967	100.0	100.0	100.0	100.0	100.0	100.0
1968	103.4	103.6	107.2	101.8	103.4	103.7
1969	112.3	112.8	117.0	110.2	111.0	112.6
1970	151.9	152.9	131.5	150.9	149.9	150.3
1971	184.9	187.2	145.0	185.3	184.2	181.8
1972	197.4	199.2	151.1	198.4	204.8	193.8
1973	222.5	226.0	166.9	216.5	227.9	218.1
1974 [a]	289.5	- [b]	198.1	330.8	347.8	282.4

Source: Bureau of Labor Statistics

[a]Six-Month Average

[b]Discontinued December, 1973

On the basis of this table, it is evident that the price indices were quite stable during the 1958-1967 decade. The price of Bituminous coal (All) increased by only 4.5 percentage points during this period and the price index for Industrial Screenings increased by only 4.1 percentage points. Metallurgical coal--both High and Low Volatile--experienced even smaller increases in price during the 1958-1967 period, while the price of Anthracite declined by seven percentage points. Rapid increases in the price of coal did not occur until sometime in 1969. But when prices did begin to rise, they rose phenomenally and rapidly. By 1972, prices for every type of coal except Anthracite had increased approximately 100 percent since the base year of 1967. Even Anthracite had increased in price by 51 percent in the same five-year period. And by 1974, only two years later, the average price of all coal except Anthracite was approximately three times what it had been in 1967. The year-to-year changes in prices further highlight the recent upsurge in coal prices and are, therefore, reported in Table II.2.

TABLE II.2

Year-to-Year Changes in the BLS Coal Price Indices by Type of Coal, 1969-1974

Year	Bituminous Coal		Anthracite	Metallurgical Coal		All Coal
	All	Industrial Screenings		High Volatile	Low Volatile	
1958-1967	4.5	4.1	7.0	2.8	2.2	3.5
1969-1970	39.6	40.1	14.5	40.7	38.9	37.7
1970-1971	33.0	34.3	13.5	34.4	34.3	31.5
1971-1972	12.5	12.0	5.9	13.1	20.6	12.0
1972-1973	25.1	26.8	15.8	18.1	23.1	24.3
1973-1974[a]	67.0	----	31.2	114.3	119.9	64.3

Source: Computed from Table II.1

[a]First 6-months of 1974.

The year-to-year changes in the price indices give ample evidence of the enormous increases in coal prices in recent years in comparison with the relative stability of prices which prevailed during the decade 1958-1967. As an example, the price change between 1969 and 1970 for Bituminous Coal-Industrial Screenings is about ten times as large as the entire change which occurred during the ten years 1958-1967. Prices for all types of coal increased by between 30 and 40 percentage points between 1969 and 1970 as well as between 1970 and 1971. Once again, Anthracite was an exception, for the rate of increase in price for this type of coal was about one-half that for all other types, though still a substantial increase.

Between 1971 and 1972, the rate of price increase diminished to approximately one-third the rate in the previous years, most likely due to the impact of wage and price controls imposed by the government in August of 1971. Moreover, in the 1972-1973 period, the rate of increase was higher than in the previous year, but also below that experienced between 1970 and 1971. With the expiration of wage and price controls in late 1973 and early 1974, the price indices of all types of coal indicate an extraordinary rate of price increase. This is particularly evident when one recalls that the data for 1974 are only for the first six months of the year. Thus, if the rate of increase for the first six months continues during the last six months, the year-to-year change figures shown in the last line of Table II. 2 must be doubled to be comparable with the other figures reported in the table.

Under the reasonable assumption that the rate of price rise during the first six months of 1974 persists through the last six months, the indices for December, 1974 will be as follows:

		Metallurgical Coal		
All Bituminous Coal	Anthracite	High Volatile	Low Volatile	All Coal
356.5	229.3	445.1	467.7	347.6

According to these figures, in general, the coal that cost $100 in 1967 will cost at least 3.5 times as much at the end of 1974. Particularly severe price increases have plagued the metallurgical coals, for coking coal on a per ton basis has increased about 4.5 times since 1967. Since coal is basic to the functioning of the U. S. economy as a source of prime energy and also in the generation of electric power, it is obvious that these recent and rapid price increases will further complicate attempts to deal with inflation.

Because electric power plays such an important role in the economy, it is important to explore in greater detail the price increases in the coal supplied to electric utilities, that is, price increases in steam coal. The relevant price index for this purpose is the Bituminous Coal-Industrial Screenings index. This composite index was discontinued at the end of 1973 and instead broken into two indices: Bituminous Coal-Manufacturers and Steam Coal-Electric Utilities. These latter two price indices (using December, 1973 as the base month) are shown in Table II.3.

TABLE II.3

Price Indices for Bituminous Coal - Manufacturers and Electric Utilities by Month: January-June, 1974 (December, 1973=100)

Month	Manufacturers	Utilities
January	102.4	104.2
February	103.3	105.7
March	104.4	107.4
April	149.5	109.4
May	155.1	110.1
June	157.7	116.7

Source: Bureau of Labor Statistics

As may be seen, in the six months since December, 1973, the price of Bituminous Coal used by Manufacturers increased by 57.7, whereas the price of steam coal increased by only 16.7 percent. Because these two types of coal are very similar (often identical), the differences in the rates of price increase are difficult to explain--even to the Bureau of Labor Statistics. According to the Bureau of Labor Statistics, the two indices should move together very closely. The fact that they do not is attributed to bad sampling. In any event, the procedure followed when constructing the indices is to be revised, as is the index for steam coal itself. In light of this problem, recent data on the prices paid by electric utilities for coal was obtained from the Federal Power Commission which, since July 1972, has required utility companies to report prices and quantities of fuels purchased for the generation of electric power (on Form 423). Monthly data taken from these forms are shown for July, 1972 through March, 1974 - the latest month for which data are available.

TABLE II. 4

Average Price Per Ton of Coal Purchased
By Electric Utilities By Month
July, 1972 to March, 1974

Month, Year	$/Ton	Index
July, 1972	8.187	100.0
August	8.250	100.8
September	8.366	102.2
October	8.388	102.5
November	8.373	102.3
December	8.310	101.5
January, 1973	8.419	102.8
February	8.593	104.5
March	8.716	106.5
April	8.800	107.5
May	8.804	107.5
June	8.941	109.2
July	8.822	107.8
August	8.843	108.0
September	9.096	111.1
October	9.350	114.2
November	9.744	119.0
December	9.996	122.1
January, 1974	11.317	138.2
February	12.527	153.0
March	13.365	163.2

Source: Federal Power Commission, Form 423

In July, 1972, the average price per ton paid by utilities was $8.19, which by July, 1973, had risen to $8.82, representing a 7.8 percent increase. But by March, 1974, the average price per ton was already 63.2 percent higher than the July, 1972, price. In contrast to the BLS Steam Coal Index, the FPC report indicates that prices were 33.7 percent higher in March, 1974 than the previous December. Care must be employed in interpreting all of these data, however, for they do not represent spot prices paid in the open market. Large quantitites of coal are purchased by utilities under long term contracts, the result of which is that in many cases, contract prices have not increased as much as spot prices.[1/] Furthermore, about 4 percent of coal consumed by utilities is obtained from captive mines. These points are emphasized in the following statement by the Federal Power Commission:

> In March [1974], the Industrial Commodities Wholesale Price Index rose 2.9 percent to 146.6. The average price paid for coal and gas rose at twice the rate of the index. . . The average price of coal jumped 6.9 percent in March to 60.8 cents per million Btu. The average March price of $13.37 per ton is 56.3 percent higher than a year ago. The average price of spot coal, $22.54 per ton, was a $1.97 per ton increase from February, and a $9.20 per ton climb from December. [2/]

Thus, coal available to utilities in the spot market in March, 1974, sold

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1/ "Of the 31.1 million tons of coal delivered [to utilities] in June [1973], 25.6 million tons (82.3%) were received under contract." A Staff Report of Cost and Quality of Fuels for Steam Electric Plant (FPC Form 423 data for June 1973), Federal Power Commission, Washington, D.C., April, 1974, p. 3.

2/ Federal Power Commission, News Release No. 20445, June 28, 1974, p. 3.

for 69 percent more than the average price of coal. Also, while the average price index increased by 33.7 percent from last December, the spot price increased by 69.2 percent. And, while the average price of coal increased by 6.9 percent during the month of March, the spot price increased by 9.6 percent. The importance of the differences in these figures is that the spot market price of coal is generally used as the basis for price determination on long term contracts. This means that as contracts expire and are renegotiated or new contracts are drawn, the average price paid for coal by utilities will continue to rise. All of this is in addition to the problem of the small utility that purchases coal in the spot market and does not enter into long terms contracts: the price of coal is increasing at a rapid rate - much more rapidly than the national indices covering all utilities indicate.

In 1974 the National Rural Electric Cooperative Association and the American Public Power Association surveyed their membership in order to obtain information on coal prices and deliveries. The survey is too detailed to discuss comprehensively here, but selected excerpts typical of the responses will be cited to illustrate the magnitude of the problems facing utilities. For example, an excellent overview of the problems reported in the survey is provided in a letter written by Mr. Robert R. Pawleski, Utility Manager of the Marshfield Electric and Water Department of Marshfield, Wisconsin to Senator William Proxmire on April 19, 1974:

> In March of this year the Peabody Coal Company of St. Louis, Missouri, (local branch office in Madison, Wisconsin) informed the Marshfield Electric and Water Departments that after the

> expiration of their contract in June, 1975, there would be no more coal available to them. The Peabody Coal Company stated that signing a new contract could not be considered and that no more coal would be available at any price, or under any terms, after the expiration of the present contract.
>
> When asked the reason for this, the Peabody Coal Company's representative replied that the coal from the mine that is normally supplied to the Marshfield Electric and Water Departments has been sold to Southern Utilities Service Corporation under a long term contract.
>
> Investigations have shown that there are many other industries and utilities, both in Wisconsin and other states, that have been or will be effected.
>
> We are presently buying coal from the Peabody Coal Company at $9.00 per ton. They have stated that our contract is marginal and their profit small or non-existent. After May 1, 1974, we will be paying $15.50 per ton for all coal from Peabody. Even at this increased rate, Peabody has restated that there will be no more coal available after June, 1975.

There are numerous reports stemming from the survey of failure to deliver coal under contract, retroactive price increases, cancellation of coal contracts and price increases. As an example of price increases, consider the experience of the Wallingford Electric Division of the Town of Wallingford, Connecticut relating to the price per ton paid for the same quality and size of coal:

April - June 1973	$14.75/ton
July - September 1973.	15.11/ton
October - December 1973.	15.90/ton
January - March 1974	21.15/ton
April 1974	29.50/ton

The utility not only experienced 4 increases in the price of coal in a single year, but also increases which resulted in a doubling of price in that one year.

On the basis of the information provided above, there can be no doubt that coal prices have risen dramatically since 1969, and that the rate of increase has accelerated in recent months. The size of the price increases can perhaps be interpreted more meaningfully when compared with prices predicted by Professor William Nordhaus of Yale University.[3/] After developing a model of energy sources in the U. S., Nordhaus uses the model to predict average prices per ton (f. o. b. mine) for Bituminous coal and Lignite in the U. S. for 1970 and each decade thereafter through 2010. These prices are as follows:

Year	Predicted $/ton
1970	$11.91
1980	12.07
1990	12.42
2000	13.34
2010	15.77

In 1970 dollars.

As reported earlier, prices paid by utilities already reached $13.37 per ton in March, 1974. Nordhaus also predicted that the rate of price increase over the 1970-2010 period would be on the order of 2.3 percentage points per year. But coal has been increasing in price in multiples of this amount each month. Clearly, the model developed by this noted economist fails to explain recent increases in prices of coal.

3/ William D. Nordhaus, "The Allocation of Energy Resources," in Brookings Papers on Economic Activity No. 3, Arthur M. Okun and George L. Perry (eds.), The Brookings Institution, 1973, pp. 529-576. In particular, see Table 7, p. 555.

The issue is whether or not these price increases are the result of the competitive functioning of the market for coal. That is to say, can the price increases be completely explained in terms of competitive factors. The answer involves an investigation of the factors which influence the cost of coal production. Also, one must consider the overall production and consumption of coal.

Table II.5 contains data on the annual production and consumption of Bituminous coal in the U. S. for the period 1955-1973. The 591 million tons produced in 1973 almost reached the same output tonnage in 1948. During the entire nineteen-year period, the peak production year was 1970, when slightly more than 600 million tons of coal were produced. Output then fell by about 8 percent in 1971, increasing again in 1972 to about the level of 1970.

The consumption of Bituminous Coal by utilities has increased steadily in both absolute amounts and in share of total production. In 1955 utilities consumed only 30 percent of the Bituminous coal produced, but by 1973 utilities consumed almost two-thirds of Bituminous production. For just the two-year period 1972-1973, utilities consumed 58.5 percent and 65.6 percent of this type of coal, respectively, representing an increase of 7.0 percentage points. An important reason for this recent and significant increase in the utilities' share of coal output is that the utilities are more dependent upon coal as a fuel because of shortages of natural gas and oil. Meanwhile, coal consumption by mining and manufacturing industries has decreased in both absolute terms and relative shares, the

latter falling to 27.2 percent in 1973 from 45.8 percent in 1955. At the same time, coal exports have removed about 10 percent of the production from the domestic market. It should be noted, however, that exported coal is generally metallurgical coal which is not used for steam generation.

TABLE II. 5

Bituminous Coal Production and Consumption
By Category By Year
1955-1973

Year	Total Production	Electric Power Utilities		Manufacturing & Mining		Exports	
		Consumption	% of Total	Consumption	% of Total	(Tons)	% of Total
1955	464,633	140,550	30.2%	212,870	45.8%	51,227	11.0%
1956	500,874	154,983	30.9	215,430	43.0	68,553	13.6
1957	492,704	157,398	31.9	210,793	42.7	76,446	15.5
1958	410,446	152,928	37.2	173,476	42.2	50,293	12.2
1959	412,028	165,788	40.2	167,761	40.7	37,253	9.0
1960	415,512	173,882	41.8	173,096	41.6	36,541	8.7
1961	402,977	179,629	44.5	166,271	41.2	34,790	8.6
1962	422,149	190,883	45.2	168,066	39.8	38,413	9.0
1963	458,928	209,038	45.5	175,969	38.3	47,078	10.2
1964	486,998	223,032	45.7	187,758	38.5	47,969	9.8
1965	512,088	242,729	47.3	196,732	38.4	50,181	9.7
1966	533,881	264,202	49.4	201,490	37.7	49,302	9.2
1967	552,626	271,784	49.1	191,066	34.5	49,510	8.9
1968	545,245	294,739	54.0	188,450	34.5	50,637	9.2
1969	560,506	308,461	55.0	183,835	32.7	56,234	10.0
1970	602,932	318,921	52.8	184,328	30.5	70,908	11.7
1971	552,192	326,280	59.0	157,024	28.4	56,633	10.2
1972	595,386	348,525	58.5	159,253	26.7	55,960	9.4
1973	591,000	386,879	65.5	160,827	27.2	52,870	8.9

Source: Survey of Current Business, Various Issues.

Could the price increases which have occurred since 1969 be the competitive result of a demand for coal greater than the available supply? In testimony on July 14, 1971, before the Subcommittee on Special Small Business Problems of the House Committee on Small Business, Walker B. Comegys, Acting Assistant Attorney General of the Antitrust Division of the Department of Justice stated that he regarded the increases in late 1970 to be the result of the "depletion of utility inventories and the unusually severe buying pressures on coal prices from April 1970 through the last half of the year in a scramble to replenish stocks. . . it was concluded that the 1970 price rises could be attributed to this interaction of supply and demand. . ." As shown in Table II. 6, Bituminous coal inventories were lower in 1969 than in 1968 which implies an inventory depletion which was remedied by the end of 1970. Indeed, it is obvious that stocks at electric utilities were higher by 20 percentage points at the end of 1970 than at the end of 1969. And the size of electric utility inventories increased steadily through 1972. As the figures show, the buildup of inventories between 1969 and 1970 was approximately 10. 7 million tons. Note, however, that even though an inventory buildup of 17 million tons occurred between 1966 and the end of 1967, prices for Industrial Screenings rose by only 5. 2 percentage points. But during the 1969-1970 period, the Industrial Screenings index increased by 40. 1 percentage points. Clearly, the supply response of the coal industry to inventory adjustments in the two periods was remarkably different.

TABLE II.6

End of Period Inventories of Bituminous Coal by Year, 1965-1973 (000s of short tons)[a]

Year	Total Stocks		Electric Utility Stocks	
	Tons	Index	Tons	Index
1965	77,393	100.0	53,437	100.0
1966	74,466	96.2	52,895	99.0
1967	93,128	120.3	69,737	130.5
1968	85,525	110.5	64,168	120.1
1969	80,482	104.0	60,597	113.4
1970	92,275	119.2	71,295	133.4
1971	89,985	116.2	76,987	181.5
1972	115,313	149.0	98,450	184.2
1973	99,022	128.0	85,512	160.0

Source: Survey of Current Business, Biennial Supplement 1973.

[a] End of period figures.

A principal tenent of the economic theory of the competitive firm is that as output prices increase, other things equal, the quantity offered for sale will increase. Stated another way, the law of supply states that output is directed related to price, other things remaining unchanged. In view of the large price increases levied by coal firms in recent years, one would, therefore, expect that the quantity of coal offered for sale would have also increased substantially. This is not, in fact, the case, for production in 1971, 1972, and 1973 was lower than production in 1970. In spite of the large price increases between 1972 and 1973, for example, Bituminous production fell by 4.4 million tons. And this decline does not appear to be due to any incapacity to produce more coal. This is evident when one looks at the potential of the coal industry to produce coal. One measure of this potential to produce is capacity utilization. "Full capacity should be defined as an attainable level of output that can be reached under normal input conditions - without lengthening accepted working weeks, and allowing for usual vacations and for normal maintenance."4/ Using this definition, Klein and Long have estimated quarterly capacity utilization rates by industry. Their estimates for the coal industry are reported in Table II.7.

4/ Lawrence R. Klein and Virginia Long "Capacity Utilization Concept, Measurement, and Recent Estimates" in Brookings Papers on Economic Activity No. 3, Arthur M. Okun and George L. Perry (eds.). The Brookings Institution, Washington, D. C., 1973, p. 744.

TABLE II.7

Coal Industry Capacity Utilization Rates
Quarterly, 1969-I through 1973-III

Year & Quarter	Capacity Utilization Rate
1969-I	92.6
1969-II	92.0
1969-III	91.5
1969-IV	94.2
1970-I	94.2
1970-II	94.0
1970-III	95.0
1970-IV	94.1
1971-I	100.0
1971-II	98.1
1971-III	95.6
1971-IV	56.7
1972-I	90.1
1972-II	92.0
1972-III	87.9
1972-IV	84.6
1973-I	85.9
1973-II	85.4
1973-III	89.0

Source: Klein and Long, Op. Cit., p. 756

Between the first quarter of 1969 and the third quarter of 1973, coal mining was at full or 100.0 percent of capacity in only one quarter, the first quarter of 1971. During every other quarter, the industry was operating at a level which did not utilize fully its productive capacity. On the basis of the capacity utilization rates estimated by Klein and Long, the industry could have achieved an output between the third quarter of 1972 and the third quarter of 1973 about 15 percent above what was produced without taking extraordinary measures. With rapid price increases, one would expect a firm in a competitive environment to expand output by utilizing facilities to their fullest. When this doesn't happen, the evidence may suggest an explicit or implicit agreement to limit output, further driving up prices, and thereby profits.

Admittedly, in the short run, it is difficult to achieve rapid expansion of physical facilities and bring new equipment into operation. It is common in industry under such circumstances, however, to increase the working hours of the labor force by operating on an overtime basis. In this way, existing facilities can be used to the maximum extent possible so that output can be increased to satisfy demand, thereby moderating the price increases. Yet, as shown in Table II. 8, there is no evidence that in recent years the coal companies have significantly increased the average length of the work week. In spite of rapid price increases, the average number of hours worked weekly in 1973 was less than the average in 1972. The average number of hours worked during 1966 and 1967 when prices of coal were relatively stable is actually

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larger than for the years 1969, 1970, 1971, and 1973. This is not the response one would expect from firms in an industry with excess capacity while prices are rising rapidly. As is also evident from the same table, little has been done to increase rapidly the number of employees in the industry. As a result, employment in 1972 was less than in 1961. It is true that there was an increase of 15.6 thousand men between 1969 and 1970 - 12.5 percent - but this rate of increase has not been sustained. Between 1970 and 1971, the Bituminous coal workforce increased by 3.9 percent, whereas between 1971 and 1972 the increase was only 2.5 percent. Thus, although the rate of price increase was greater in the 1972-1973 period than the 1969-1970 period, the rate of employment increase diminished. This evidence does not support the contention that the coal industry was increasing supply in response to price increases.

If the demand for coal is price inelastic, that is to say, if the quantity of coal demanded by the market is not sensitive to price increases, then coal producers can pass cost increases on to coal consumers directly. During the so-called energy crisis, the substitutes for coal (oil and natural gas) have been in very short supply, so that the argument that the demand for coal is price inelastic appears reasonable. The important issue here, thus, is the extent to which increases in coal prices can be explained by increases in the cost of production.

TABLE II.8

Average Employment, Hourly Wages, and Hours Worked Weekly in Bituminous Coal Mining By Year, 1955-1973

Year	Average Employment	Average Hourly Wages	Average Hours[a] Worked Weekly
1955	225,093	$2.47	37.3
1956	228,163	2.72	37.5
1957	228,635	2.92	36.3
1958	197,402	2.93	33.3
1959	179,636	3.11	35.8
1960	169,400	3.14	35.8
1961	150,474	3.12	35.9
1962	143,822	3.12	37.0
1963	141,646	3.15	38.9
1964	128,698	3.30	39.2
1965	133,732	3.49	40.2
1966	131,752	3.66	40.8
1967	131,523	3.75	40.7
1968	127,894	3.86	40.2
1969	124,532	4.24	40.1
1970	140,140	4.58	40.7
1971	145,644	4.86	40.5
1972	149,265	5.34	41.0
1973	-	5.73	39.8

Source: Bituminous Coal Data, National Coal Association

[a] Eleven month average; July is excluded because of vacation.

An important element of the total cost of producing coal is wages paid to coal miners. Average hourly wages paid are reported by year in Table II. 8. As may be seen, average hourly wages increased from $3. 75 to $5. 73, or by 52. 8 percent, between 1967 and 1973. It is perhaps more interesting to consider the year-to-year percentage changes which are reported in Table II. 9.

TABLE II.9

Year-to-Year Percentage Changes in Average Hourly Wages in Bituminous Coal Mining, 1965-1975

Year	% Change
1965 - 1966	4.9
1966 - 1967	2.5
1967 - 1968	2.9
1968 - 1969	9.8
1969 - 1970	8.0
1970 - 1971	6.1
1971 - 1972	9.9
1972 - 1973	7.3

Source: Computed from Table II.8

Between 1965 and 1966, the average hourly wages increased by 4. 9 percent, even though the price index of All Bituminous coal increased by only 3. 6 percentage points (see Table II. 1). Clearly, the rate of price increase was less than the rate of wage increase. The rate of wage increases then decreased to 2. 5 percent between 1966 and 1967 and to 2. 9 percent between 1967 and 1968. Between 1968 and 1969, the average hourly

wage increased by 9.8 percent and was accompanied by an 8.9 percentage point increase in the All Bituminous coal price index. In sharp contrast, an 8.0 percent rise in wages between 1970 and 1971 was associated with a 33.0 percentage change in prices. Even a casual review of these data indicates that the relationship between wage and price increases is substantially different in the post-1969 years. Although one can assert that increasing wage rates are a factor in increasing the price of coal, it is clearly not possible to justify the substantial increases in recent years on the basis of wage increases alone. For it is obvious that in recent years price increases have outstripped wage rate changes many times over.

A second factor which has led to increased costs in mining of Bituminous coal is the Federal Mine Health and Safety Act of 1969. After the passage of the Act, labor productivity in underground mines diminished. This is seen by consulting Table II. 10, which provides recent information on the output (in tons) per man/day in underground mines, strip mines, and auger mines. As may be seen, output per man/day for underground mines increased throughout the period 1967-1969, though decreasing thereafter. Output reached a maximum of 15.61 tons per man/day in 1970, decreasing to about 12 tons per man/day two years later. Regarding 1971, it should be recalled that this was a strike year for the coal industry and also a year of economic slow-down; both factors may have exerted a downward push on productivity. This represents a decline in

labor productivity of approximately twenty percent. Productivity in strip mines, however, has not been affected at all by the Act. Indeed, productivity in 1972 remained at an all time high of about 36 tons per man/day. Output per man/day at auger mines has fluctuated over this period. Bituminous coal produced by auger mines, however, is an insignificant proportion of total production - between 2 and 3 percent of total Bituminous output (see Table II. 11). Thus, one can conclude that the health and safety regulations have only increased the cost of the extraction of coal from underground mines.

TABLE II. 10

National Average Output Per Man Per Day (Tons)
at Bituminous Coal Mines
By Year and By Mining Method
1967-1972

Year	Underground		Strip Mines		Auger Mines	
	Tons	Index	Tons	Index	Tons	Index
1967	15.07	100.0	35.17	100.0	46.48	100.0
1968	15.40	102.2	34.24	97.4	40.46	87.0
1969	15.61	103.6	35.71	101.5	39.88	85.8
1970	13.76	91.3	35.96	102.2	34.26	73.7
1971	12.03	79.8	35.69	101.5	39.00	83.9
1972	11.91	79.0	35.95	102.2	43.00	92.5

Source: Bituminous Coal Data 1972, 1973. National Coal Association.

TABLE II.11

Production of Bituminous Coal
By Method of Mining and Year
1955-1972*

Year	Total Production	Strip Mining		Underground Mining		Auger Mining	
		Output	% of Total	Output	% of Total	Output	% of Total
1955	464,633	115,093	24.7%	343,465	73.9%	6,075	1.3%
1956	500,874	127,055	25.3	365,774	73.0	8,045	1.6
1957	492,704	124,109	25.1	360,649	73.1	7,946	1.6
1958	410,446	116,242	28.3	286,884	69.8	7,320	1.7
1959	412,028	120,953	29.3	283,434	68.7	7,641	1.8
1960	415,512	122,630	29.5	284,888	68.5	7,994	1.9
1961	402,977	121,979	30.2	272,766	67.6	8,232	2.0
1962	422,149	130,300	30.8	281,266	66.6	10,583	2.5
1963	458,928	144,141	31.4	302,256	65.8	12,531	2.7
1964	486,998	151,859	31.1	321,808	66.0	13,331	2.7
1965	512,088	165,241	32.2	332,661	58.1	14,186	2.4
1966	533,881	180,058	33.7	338,524	63.4	15,299	2.8
1967	552,626	187,134	33.8	349,133	63.1	16,360	2.9
1968	545,245	185,836	34.0	344,142	63.1	15,267	2.8
1969	560,505	197,023	35.1	347,132	61.9	16,350	2.9
1970	602,932	244,117	40.4	338,788	56.1	20,027	3.3
1971	552,192	258,972	46.8	275,888	49.9	17,332	3.1
1972	595,386	275,730	46.3	304,103	51.1	15,554	2.6

* All Production Figures Are in Thousands of Tons

Source: Bituminous Coal Data, 1973; National Coal Association

It is difficult to determine the additional per ton cost resulting from this legislation. The limited information which is available was provided in a statement made before the Subcommittee on Special Small Business Problems of the House Select Committee on Small Business on July 13, 1971. The testimony which was given indicates that the costs are on the order of 20 to 40 cents per ton. If this estimate is reasonably accurate, then health and safety regulations explain only a small fraction of the price increases. In any event, the cost increase would be a one-time increase and would, therefore, not explain the continuing increases in the price of coal. Moreover, Table II. 11 shows that the output of underground mines decreased between 1966 and 1971. In fact, the proportion of total output taken from underground mines has declined over the longer period 1955 to 1971. Whereas almost three-fourths of Bituminous coal production came from underground mines in 1955, only half came from these mines in 1972. Certainly, health and safety of the worker is much less of an issue in strip mining than in underground mining. It should also be pointed out that even though all Anthracite coal is taken from underground mines, the price index for Anthracite has not increased nearly as rapidly as that for Bituminous coal.

Even though there has been little data on the economic impact of the mine health and safety legislation, the U. S. Bureau of Mines

reported that some marginal mines have been closed, but that overall productivity has remained constant due to the opening of new, more efficient mines.[1/]

With regard to proposed regulations regarding surface mining and environmental issues on coal, Dr. David B. Brooks, a highly qualified coal economist who was formerly employed by the Bureau of Mines and is now Head of the Economic Research Section of the Department of Energy, Mines and Resources of the Canadian Government, stated that the major environmental consideration with respect to coal is sulphur dioxide emissions, but he pointed out that this should be regarded as a utility cost and not a coal cost.[2/] Moreover, he observed that the nature of increased production cost for strip mining (such as site restoration) is on the order of only $.05 to $.10 per ton.

All the evidence presented in this section on prices, production, and consumption of coal leads to the conclusion that phenomenal increases in the price of all types of coal have occurred in the past five years. Moreover, the rate of price increase has been accelerating in recent months, and there is no prospect for immediate relief. Particularly hard-hit by these huge price increases are the nation's electric utilities which

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1/ U. S. Bureau of Mines, Restrictions on the Uses of Coal (June, 1971), p. 53.

2/ To the extent that coal companies have had to incur additional costs to obtain low-sulfur coal (for example by opening new mines), pollution regulations do affect coal companies. However, no data are available on such costs.

consume about two-thirds of the Bituminous coal produced. Taken together, productivity, wages, health and safety regulations, and environmental factors do not account for all of the price increases. Furthermore, these price increases have occurred in spite of the fact that the coal mining industry has been operating at a level substantially below normal capacity. Had the coal operators been willing to produce at full capacity, these enormous price increases could have been accompanied by substantial increases in output. The fact that this did not happen, suggests that coal producers restricted output to further drive up prices and profits. In the next section, consideration is given to recent profits reported by coal companies.

III. Coal Company Profits

In view of the substantial increases in the price of coal which have not been matched by similar increases in costs of production in recent years, one would expect profits of coal operators to have increased. To determine whether in fact this has been the case, an attempt was made to obtain data from annual reports and other sources for the fifteen largest coal producers in 1973. Unfortunately, this effort was largely unsuccessful for at least three reasons. First, captive coal is not sold in the open market but is instead used as an intermediate product (for example, metallurgical coal is an imput in steel processing). As a result, profit data are not available as companies do not report profit figures for intermediate products. Second, as will be discussed in detail in section IV of this report, a large proportion of U. S. coal operations have been acquired by other firms--particularly oil companies. Although a company is required to report profit data by major product to the Securities and Exchange Commission on Form 10-K when sales of the product account for fifteen percent or more of the total revenues, some of the coal operations that are under control of large corporations (Gulf Oil, Kennecott Copper, Occidental Petroleum, and General Dynamics) do not account for the required percentage. Coal profits for these companies, therefore, are not available. Third, corporations with three hundred or fewer shareholders are also not required to report to the SEC. This, too, precludes any attempt at obtaining profit figures for all companies.

As a result of these difficulties, profit data are, at best, sketchy and hence do not permit a comprehensive analysis. In any case, data from SEC sources for three companies are presented in Table III. 1.

TABLE III. 1

Annual Profits of Three Major Coal Producers, 1971-1974
(thousands of dollars)

Company	1971	1972	1973	1974[a]
North American Coal	1, 248	2, 629	4, 452	6, 228
Eastern Associates	11, 438	4, 864	(315)	9, 229
Westmoreland Coal	4, 433	4, 386	4, 702	10, 128

Source: Securities and Exchange Commission Reports

[a]Based on first quarter 1974

As may be seen, North American Coal and Westmoreland Coal have experienced substantial gains in profits since 1971. If the profit rate in the first quarter of 1974 continues throughout 1974, North American's profit in 1974 will be about 5 times as large as in 1971 and Westmoreland Coal's 1974 profit will be about 2. 2 times as large as the 1971 figure. Eastern has had a less even profit record over the past 4 years. Despite this slight volatility in profits, 1974 profits will be about 1. 9 times that of 1972, although they are slightly less than 1971 profits.

The financial condition of a larger sample of companies can be considered by using Internal Revenue Service data. The net income figures covering a sample of companies that receive the largest percentage

of their revenue from coal operations are reported in Table III. 2.

TABLE III. 2

Net Income of Companies Reporting the Largest Percentage of Total Receipts from Coal Operations, 1966-1971 (thousands of dollars)

Year	Number of Companies	Net Income Less Deficit	Average Net Income Per Firm
1966	2,336	$ 96,120	41.1
1967	2,304	65,687	28.5
1968	1,581	56,724	35.9
1969	1,676	13,699	8.1
1970	2,228	283,365	127.2
1971	1,664	159,201	95.7

Source: Bituminous Coal Data, 1973. National Coal Association.

Unfortunately, the date are not available from this source for 1972 and 1973. In any event, it is noteworthy that net income of all firms in 1970 exceed the sum of the preceeding four years by more than $51.1 million. Net income in 1971 was greater than the sum of the reported net income in 1967, 1968, and 1969. These comparisons, of course, are influenced to some degree by the number of companies reporting. To correct for this, the average net income per firm has been computed. On the basis of these calculations, it is found that the average net income per firm in 1970 is greater than the sum of the average net incomes for the years

1966-1969. Average net income per firm in 1966 was one third that of 1970 and about 43 percent of the 1971 figure. Average net income per firm fell by about 25 percent between 1970 and 1971 when price controls were placed on coal and the rate of price increase was cut by half. Even though these data are not as complete as would be desirable, they are indicative of the substantial increases in profits earned by coal producers.

Oil companies have a large stake in coal operations, and the recent profits of oil companies are now legend. Although it is not always possible to determine the increase in profits due to coal operations per se for these companies, it is reasonable to assume that part of the increase in profits can be attributed to coal. For purposes of comparison, Table III. 3 contains profit figures for oil firms engaged in coal operations during 1972 and 1973.

As may be seen, profits for these companies during the last two years have been sizeable. Profits range from a high of roughly $1.5 billions to a low of $19.7 millions in 1972. The profit highs and lows in 1973 are substantially greater, ranging from $2.4 billions to $74.1 millions. In terms of the percentage change in profits over this two year period, not one company recorded a decrease. Indeed, even the smallest percentage increase in profits represented a 28 percent gain. And Occidental reported a whopping 305 percent increase in profits. Surely, the coal operations of these companies contributed to this bright profit picture.

TABLE III. 3

Profits for Oil Companies Engaged in Coal Operations
for 1972 and 1973 (dollars in thousands)

Company	1972 Profits	1973 Profits	% increase
Exxon	$1,534,600	$2,440,000	59
Mobil	573,300	842,800	47
Texaco	891,300	1,292,400	45
Gulf	446,900	800,000	79
Standard (Cal.)	547,800	843,600	54
Standard (Ind.)	375,900	511,200	36
Shell	259,900	332,700	28
Continental	169,700	242,700	43
Atlantic Richfield	193,200	270,500	40
Standard (Ohio)	59,800	74,100	24
Occidental	19,700	79,800	305

Source: United Mine Workers Journal, April 1-15, 1974, p. 18.

Some other profit figures which were available are reported in Table III. 4. As is quite clear from the information contained in this table, this group of coal companies and some of the larger parent companies of coal companies has recorded extremely large profits in recent years. Not one of these companies incurred losses in 1971, 1972,

or the first quarter of 1973. Among the independent companies, Utah International led the others with $39.8 millions in profits in 1972. Pittston was not far behind with $28.5 millions. Consolidation Coal which is owned by Continental Oil, contributed $16.6 millions in profits to its parent company, an increase of 118 percent over the $7.6 millions in 1971. The two steel companies with captive mines also showed substantial profits. Other companies turned in sizeable profits, too.

TABLE III.4

Profits of Selected Companies Engaged in Coal Operations

Company	1971 Profits	1972 Profits	Jan.-March 1972	Jan.-March 1973	Percent Change
Kennecott Copper	$103,119,000	$107,097,000	$18,400,000	$28,600,000	+55
Peabody Coal	8,513,000	15,668,000	N. A.	N. A.	+83
Pittston	43,437,000	28,585,000	9,900,000	7,400,000	-25
U. S. Steel	154,516,000	156,987,000	19,000,000	49,000,000	+160
American Metal Climax	51,310,000	66,190,000	13,700,000	20,200,000	+48
Amax Coal	15,000,000	23,000,000	N. A.	N. A.	+53
Bethlehem Steel	139,239,000	134,585,000	25,000,000	40,500,000	+61
Old Ben Coal	12,200,000	10,900,000	N. A.	N. A.	N. A.
Consolidation Coal	7,600,000	16,600,000	N. A.	N. A.	+118
Utah International	35,500,000	39,800,000	17,398,000	21,712,000	+24

Source: United Mine Workers Journal, July 15-31, 1973, p. 9.

The percentage change in profits from the first quarter of 1972 to the same period in 1973 is also reported in Table III. 4. As may be seen, every company but one increased its profits during this period. Even the company which sustained a decrease earned $7. 4 million in profits in the first quarter of 1973. The other companies saw their profits increase by at least 24 percent and in one case by 160 percent. Such increases in profits are exceptionally large, to say the least.

All of the available information on profits in the coal industry suggests that the recent and rapid increases in coal prices have been accompanied by similar increases in coal profits. As the next section will document, the structure of the coal industry is conducive to non-competitive activities which may well explain both the price and profit increases.

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IV. Economic Structure of the Coal Industry

The discussion in Section II suggests that there is no satisfactory explanation for the full extent of the exceptionally large price increases in coal during recent years in terms of higher production costs resulting from lower productivity, increased wages and recent health and safety legislation. It is important, therefore, that an examination be made of the economic structure of the coal industry to determine whether any substantial changes may have occurred in recent years which could have made it possible for the dominant members of the industry to establish artifically higher prices by noncompetitive methods.

Even though there were approximately 4,000 coal mining concerns in 1972, the great majority of these were very small independent operators. For instance, as Table IV. 1 shows, there were 3,413 firms producing less than 100,000 tons per year. To put these figures in perspective, it should be pointed out that all of these firms accounted for only about 5 percent of total coal production. In contrast, the 76 operating groups[1/] consisting of 139 firms producing over one million tons accounted for over 74 percent of the total coal produced.

1/ A company group consists of a number of firms tied together through "common ownership, investment, production or sales management, or a combination of such factors." Keystone Coal Industry Manual, 1970 Coal Mine Directory, (New York: McGraw-Hill, Inc., 1970) p. 148.

TABLE IV. 1

SIZE DISTRIBUTION OF BITUMINOUS COAL AND LIGNITE

COMPANIES AND OPERATING GROUPS IN 1972

Size Class (Coal Output Per Year)	Number of Groups	Number of Companies	Production In Thousands of Tons	Production as Percent of Total
Over 1,000,000 Tons	76	139	440,204	74.6
100,000--1,000,000 Tons	441	448	119,745	20.3
Under 100,000 Tons		3,413	30,051	5.1

Source: Keystone News Bulletin, 1972, p. 6.

Thus, even though the coal industry is populated by a large number of sellers, output is still controlled by a relatively small number of firms. The economic significance of this situation lies in the fact that economic theory clearly suggests that the greater the concentration of an industry's production in a relatively few firms the less intense the competitive rivalry. As a result, it is more likely that the price in such a situation will be higher than the price which would prevail in a perfectly competitive market.

For purposes of historical comparison, Table IV. 2 contains the percentages produced by various tonnage groups for selected years. As may be seen, firms producing over one million tons have enlarged their share of total coal production to 74.6 percent in 1972 from 50.5 percent

in 1949, roughly a 48 percent increase in only 25 years. In sharp contrast, the smaller firms have seen their share of total coal production slip to 5.1 percent from 17.9 percent during the same period. The trend is clearly towards increasing control over coal production by a small minority of firms.

TABLE IV. 2

Percentages Produced
By Various Tonnage Groups

Tonnage Range	1949	1960	1965	1970	1971	1972
1,000,000 Tons and Over	50.5	64.9	68.1	72.3	70.3	74.6
100,000 to 999,999 Tons	31.7	22.1	22.5	21.5	24.2	20.3
Under 100,000 Tons	17.9	13.0	9.4	6.2	5.5	5.1

Source: Keystone Coal Industry Manual, 1973

To obtain a more detailed view of the coal industry's output distribution, Table IV.3 reports the annual production and industry share figures of the 50 largest coal operating groups for the years 1943 through 1973. The overall trend in the share of total coal production by these groups has clearly been upwards. Starting with 45.5 percent of total coal production in 1943, the next thirty years saw this percentage climb to 66.4 percent in 1973. Although the share of the top 50 groups has risen substantially during this period, total industry tonnage was about the same in 1973 as in 1943. This suggests that the average size of the larger firms is increasing relative to the average size of the smaller firms.

TABLE IV.3

Annual Production and Industry Share of the Top 50
Bituminous Coal Operating Groups

Year	Top 50 Tonnages	Industry Tonnages	% Top 50
1943	268,399,422	590,177,069	45.5
1944	277,902,542	619,576,240	44.8
1945	254,680,178	577,617,327	44.1
1946	230,346,662	533,922,068	43.1
1947	263,477,220	630,623,722	41.8
1948	256,567,797	599,518,229	42.8
1949	190,321,125	437,868,036	43.5
1950	233,393,064	516,311,053	45.2
1951	254,156,803	533,664,732	47.6
1952	232,333,768	466,840,782	50.0
1953	242,677,400	457,290,449	53.2
1954	211,812,342	391,706,300	54.0
1955	254,503,011	464,633,408	54.7
1956	279,844,275	500,874,077	55.9
1957	288,681,591	492,703,916	58.5
1958	241,067,718	410,445,547	58.7
1959	244,222,585	412,027,502	59.2
1960	248,936,537	415,512,347	59.9
1961	239,652,075	402,976,802	59.4
1962	254,393,843	422,149,325	60.2
1963	273,550,751	458,928,175	59.6
1964	302,213,579	486,997,952	62.0
1965	319,354,805	512,088,263	62.3
1966	341,129,969	533,881,210	63.8
1967	365,403,669	552,626,000	66.1
1968	374,221,189	545,245,000	68.6
1969	381,697,923	560,505,000	68.1
1970	402,782,490	602,932,000	66.8
1971	357,492,567	552,192,000	64.7
1972	399,448,778	595,386,000	67.0
1973	392,124,322	590,000,000	66.4

Source: Keystone News Bulletin, March 1974, p. 20.

Information regarding the extent of control over coal production by the 15 largest coal companies in the United States in 1973 is reported in Table IV. 4. The combined market shares of the 15 largest companies was 49. 7 percent in 1973, compared to 40. 9 percent in 1962. The top 15 companies now control, therefore, about half of the nation's coal output. The largest coal company, Peabody Coal Company, accounted for 11. 8 percent of total coal output in 1973. This means that Peabody alone produces more than twice as much coal as the smallest 3, 400 companies combined.

TABLE IV. 4

TOTAL BITUMINOUS COAL PRODUCTION AND MARKET SHARES OF THE FIFTEEN LARGEST PRODUCERS IN 1973

Rank	Parent	Coal Subsidiary (and date acquired)	Bituminous Coal Production (Tons)	Market Share
1	Kennecott Copper Corp.	Peabody Coal Co. (1967)	69,918,787	11.8
2	Continental Oil Co.	Consolidation Coal Co. (1966)	60,477,363	10.3
3	Occidental Petroleum Corp.	Island Creek Coal Co. (1968)	22,879,320	3.9
4	Pittston Coal Co.	-----	18,796,305	3.2
5	American Metal Climax Inc.	Amax Coal (1969)	16,657,552	2.8
6	United States Steel Corp.	-----	16,222,038	2.8
7	Bethlehem Steel Corp.	Bethlehem Mines	14,129,000	2.4
8	North American Coal Corp.	-----	12,501,316	2.1
9	Standard Oil Co. (Ohio)	Old Ben Coal Corp. (1968)	10,846,684	1.8
10	Eastern Gas and Fuel Assoc.	Eastern Associates Coal Corp.	10,640,063	1.8
11	Westmoreland Coal Co.	-----	8,808,651	1.5
12.	General Dynamics Corp.	Freeman Coal Mining Corp.	8,669,921	1.5
13	Gulf Oil Corp.	Pittsburgh & Midway Coal Mining Co.	8,064,089	1.4
14	Utah International Inc.	-----	7,389,321	1.3
15	American Electric Power Co.	Central Ohio Coal Co.	6,563,194	1.1

Source: Keystone News Bulletin, March 1974, p. 20.

"Troubled Coal Industry," National Journal Reports, Government Research Corporation, June 29, 1974, p. 954.

Information is also available regarding the name of the parent company of the fifteen largest coal producers in 1973, and Table IV.5 has been constructed to determine the share of output by industry affiliation.[1/] As the figures in this table show, four of the top fifteen companies are owned by large oil companies. Of the remaining companies, six are owned by other large industrial concerns well known for their activities outside the coal business. Only three of the companies among the top fifteen are still independent coal companies. Only eleven years earlier, however, there were eleven such companies. It can also be seen that the three independent coal companies account for only 13.7 percent of the coal output of the top fifteen companies and only 6.8 percent of the total coal output. In contrast, the four-oil affiliated companies account for 35.0 percent of the coal output of the top 15 producers and 17.4 percent of the total coal output. Excluding the independent coal producers, the remaining top fifteen producers accounted for 42.9 percent of the nation's coal output in 1973. Just eleven years earlier, however, the situation was reversed. For in 1962 the independent coal companies accounted for 31.5 percent of industry production, while the remaining large industrial companies accounted for only 9.4 percent of total coal output. The two

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1/ The industry affiliation of all coal companies producing one million or more tons annually is provided in the Appendix.

steel companies (which are both captive coal producers) accounted for 5.3 percent of total output in 1962 versus 5.2 percent of total output in 1973--hardly any change at all.

TABLE IV.5

Industry Affiliations of the 15 Largest Coal Producers in 1973

Primary Industry	Number of Firms	Percentage of Top 15 Production	Percentage of Total Coal Production
Coal	3	13.7	6.8
Petroleum	4	35.0	17.4
Captive Producers	2	10.4	5.2
Other Non-Coal Firms	6	41.0	20.3

Source: Keystone News Bulletin, March, 1974, p. 20

"Troubled Coal Industry," National Journal Reports, Government Research Corporation, June 29, 1974, p. 954

It is apparent, then, that there has been an exceptionally rapid shift in the control of the coal mining industry between 1962 and 1973. Large industrial concerns in other businesses, particularly oil and gas companies, are now in a strong position to exercise considerable control over the coal industry. Specifically, this increased concentration of ownership in the supply of not only coal but all energy is likely to result in reduced competition among the four major fuels (oil, gas, coal, and

uranium) with a consequent rise in all fuel prices. Furthermore, now that the large petroleum firms have acquired significant interests in the coal industry, they have less incentive to pursue any technological advances in coal which represent a threat to their oil and gas operations. Any attempt to retard technological advance, however, is in essence a reduction in competition. This point is clearly expressed in a staff report by Joseph P. Mulholland and Douglas W. Webbink for the Federal Trade Commission as follows:

> Efforts by fuel producers to adapt their products to the needs of energy consumers represent an important form of competition that eventually influences the intensity of interfuel competition as well as fuel price levels. An important example is the on-going research into processes for transforming coal into oil and natural gas. Owing to the vast amounts of coal available for such developments, the potential for synthetic petroleum products derived from coal can be a significant threat to the petroleum industry. 2/

As impressive as the data discussed above may be in pointing toward the continued growth of large enterprise in the coal industry, it does not detail sufficiently the extent of economic concentration. For such detailed information one turns to concentration ratios. These ratios typically refer to the share of output accounted for by the four, eight,

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2/ Joseph P. Mulholland and Douglas W. Webbink, "Concentration Levels and Trends in the Energy Sector of the U. S. Economy," Federal Trade Commission, March 1974, p. 31.

or fifteen largest firms in an industry. The economic importance of these measures is that where a relatively few firms possess a sufficiently large share of the market, none can or will remain indifferent to the actions of the others. Stated another way, the greater the level of concentration the more likely one is to find attempts to coordinate price and output policy to achieve monopoly profits.

Data on concentration ratios for the coal industry for 1973 are reported in Table IV. 6. For purposes of comparison, the concentration ratios or calculated shares of total output accounted for by the top four, top eight, and top fifteen firms with and without captive production are presented. The reason for even listing concentration ratios after excluding captive production is that coal taken from captive mines is used only by the parent firm and is, therefore, not sold in the open market. As may be seen, when captive production is excluded the degree of concentration increases to 30. 7 from 29. 2 at the 4 firm level. This represents the largest increase in concentration since the two largest captive producers (U. S. Steel and Bethlehem) ranked sixth and seventh in the overall top 15 list. In any event, given that there were more than 4,000 coal producing firms in 1973, the figures in Table IV. 6 indicate a substantial degree of concentration in the coal industry. Only four firms account for almost one-third of the total output. Including just another eleven firms and the share jumps to nearly one-half.

TABLE IV.6

Bituminous Coal and Lignite Production Concentration Ratios, Inclusive and Exclusive of Captive Production, 1973

Concentration Level	Including Captive Production	Excluding Captive Production
4 Firm	29.2	30.7%
8 Firm	39.3	39.8
15 Firm	49.6	46.9[a]

Source: Keystone News Bulletin, March 1974, p. 20.

[a]13 rather than 15 firms

It is also important to recognize that some of the largest coal companies that sell in the commercial market are also engaged in the marketing of coal produced by other companies, in addition to selling the coal produced from their own mines or the mines of their affiliates. These companies either buy coal from the other producers for resale or act as brokers for other companies in the sale of their coal. This effectively increases the control of the large companies that engage in such purchasing and brokerage activities, since the coal that is involved is produced by smaller companies. The actual control over the commercial market by the largest coal companies is even greater, therefore, than the figures reported in Table III.6 indicated. It

is estimated that these 15 companies control close to two-thirds of the sales in the commercial market. Thus, a relatively small number of very large and economically powerful corporations appear to be in a position to exercise a considerable degree of control over the marketing of coal.

The concentration ratios are more meaningful when it is realized that the relevant market for measuring concentration may be a regional rather than national market. A major reason is that transportation costs for coal are substantial, even for coal transported a few hundred miles. As a case in point, Table IV. 7 shows that concentration in the Midwest region is significantly greater than that found on the national level. Moreover, concentration has been increasing at a rapid rate in the Midwest just as it has been increasing at the national level. Indeed, the 4 firm and 8 firm concentration ratios have more than doubled since 1955.

TABLE IV. 7

Concentration Ratios for Coal Production
in the Midwest and at the National Level in 1970

Concentration Ratios	Midwest	National
4 Firm	65. 6	30. 2
8 Firm	85. 6	40. 7
20 Firm	97. 0	51. 7

Source: Keystone Coal Industry Manual, U. S. Coal Production by Company. . . 1970.

Various issues of Keystone News Bulletin.

Staff Report to the Federal Trade Commission, p. 311.

Data on trends in concentration of economic power in the coal industry at the national level during the post-1955 period are shown in Table IV. 8. At the 4 firm level, concentration has nearly doubled since 1955. Somewhat smaller but still significant increases have taken place in the 8 firm and 15 firm concentration ratios. Taken together, these ratios indicate that concentration in the coal industry has increased significantly during the past twenty years. Since 1970 the concentration ratios do display a slight variability both upwards and downwards, but certainly do not indicate a reversal of their longer run tendency to increase.

TABLE IV. 8

BITUMINOUS AND LIGNITE PRODUCTION CONCENTRATION RATIOS, 1955, 1960, 1965, 1970, 1971, 1972, 1973
(Percent)

Concentration Level	1955	1960	1965	1970	1971	1972	1973
4 Firm	17.8	21.4	26.6	30.2	27.8	30.2	29.2
8 Firm	25.4	30.5	36.3	40.7	37.6	40.0	39.3
15 Firm	39.5[a]	44.5[a]	45.0	51.7	48.1	50.6	49.6

Source: Joseph P. Mulholland and Douglas W. Webbink, "Concentration Levels and Trends in the Energy Sector of the U. S. Economy," Staff Report to the Federal Trade Commission, March 1974, p. 138.

Various issues of Keystone News Bulletin.

[a]20 Firm Concentration Level

The rising concentration in coal production reflects a number of factors. As already noted, production by large companies has become increasingly important in the post-war years. Companies with an output of over one-half million tons per year have increased their share of total production, while all of the smaller size companies have experienced declines in relative production shares. The economic reason for this structural shift appears to be that there are economies of scale in strip mining, a method of producing an ever-increasing percentage of all coal since 1955 (see Table II. 11). Assuming that the use of strip mining continues to grow in the future, this could lead to further increases in concentration because of the advantages of larger size mines. What is bothersome is that there is no evidence that economies of scale have been reflected in lower prices.

TABLE IV. 9

Chronological List of Coal Company Acquisitions, 1959-1974

Year	Acquired Coal Company	Acquiring Company
1959	Freeman Coal	General Dynamics Corp.
1963	Midland Electric Coal	Peabody Coal
1964	Pittsburgh & Midway Coal	*Gulf Oil Corporation
1966	Consolidation Coal Co.	*Continental Oil Co.
1966	United Electric Coal Co.	General Dynamics Corp.
1968	Old Ben Coal Corp.	*Standard Oil (Ohio)
1968	Enos Coal	*Standard Oil (Ohio)
1968	Island Creek Coal Co.	*Occidental Petroleum Corp.
1968	Peabody Coal Co.	Kennecott Copper
1968	Omar Mining	Wheeling-Pittsburgh Steel
1968	Winding Gulf	Westmoreland Coal
1968	Hawley Fuel Corp.	*Belco Petroleum Corp.
1968	Colombine Coal Co.	Bartep Industries
1968	United Pocahontas Coal Co.	National Bulk Carriers
1969	Joanne Coal	Eastern Gas & Fuel
1969	Amax Coal Co.	American Metal Climax
1969	Eastern Coal	Pittston Co.
1969	Imperial Smokeless	Westmoreland Coal
1969	Maust Properties	*Occidental Petroleum Corp.
1969	Virginia Iron, Coal & Coke	Bates Manufacturing Co.
1969	Canterbury Coal Co.	*Westrans Industries, Inc.
1969	Monterey Coal Co.	*Humble Oil and Refining
1969	Thompson Creek Coal & Coke	North American Resources & Chemical

TABLE IV.9 (cont'd)

1970	Ranger Fuel (30% Interest)	Eastern Gas & Fuel
1970	Sterling Smokeless	Eastern Gas & Fuel
1970	C & K Coal Co.	Gulf Resources & Chemical
1970	Barnes & Tucker Co.	Alco Standard Corp.
1970	Breathitt County Coal Corp.	*Falcon Seaboard, Inc.
1970	Black Eagle Coal Co.	*Falcon Seaboard, Inc.
1970	Mt. Top Stripping	*Falcon Seaboard, Inc.
1970	Pine Bluff Auger Co.	*Falcon Seaboard, Inc.
1970	Boone County Coal Corp.	*Zapata Corp.
1970	Marietta Coal Co.	*McCulloch Oil Corp.
1970	Kingdom Come Coal Co.	*McCulloch Oil Corp.
1970	No. 7 Corp.	*McCulloch Oil Corp.
1970	Big Four	*McCulloch Oil Corp.
1970	Aloe Coal Co.	Pullman, Inc.
1970	Oak Leaf Coal Co.	Sherwood Leasing Corp.
1970	Call & Ramsey Coal Co.	Universal Acceptance Corp.
1970	Tenn-Ky. Coal Co.	U. S. Plywood-Champion Papers
1970	Twilight Industries, Inc.	*U. S. Natural Resources
1970	Path Fork Harlan Coal Co.	U. S. Plywood-Champion Papers
1970	Gauley Coal Land Co.	Westvaco Corp.
1971	Black Lode Coal Co.	*Crestmont Oil & Gas Co.
1971	Dusky Diamond Coal Co.	Dal Petroleum
1971	Pratt Mining Co.	Federal Resources Corp.
1971	Webster County Coal Corp.	*Mapco, Inc.
1971	Carbon Fuel	*McCulloch Oil Corp.
1971	River Processing, Inc.	Pargas, Inc.
1972	Upshur Coals, Ltd.	Alco Standard Corp.
1972	Sigmon Construction Co.	*Ray Resources Corp.
1972	Kristianson & Johnson Coal	*Westrans Industries, Inc.

TABLE IV.9 (cont'd)

1973	Alumbaugh Coal Corp.	Donovan Construction Co.
1973	Elk Horn Coal Co.	*Ethyl Corp.
1973	Fresno Coal Co.	General Exploration Co.
1973	Blue Diamond Coal	W. R. Grace Co.
1973	Zeigler Coal Co.	Houston Natural Gas Corp.
1973	Interstate Coal Co., Inc.	Kaneb Services, Inc.
1973	Lelco, Inc.	Kaneb Services, Inc.
1973	Mountain Clay, Inc.	Kaneb Services, Inc.
1973	Pickands Mather & Co.	Moore & McCormack Co.
1973	Call & Ramsey Coal Co.	National Industries, Inc.
1973	Rapoca Resources	Rapoca Energy Corp.
1974	Buckhorn Hazard Coal	General Energy Corp.
1974	Brilliant Coal Co.	Great Northern Nekoosa Corp.
1974	Belva Coal Co.	*International Mining & Petroleum

Source: Joseph P. Mulholland and Douglas W. Webbink, "Concentration Levels and Trends in the Energy Sector of the U. S. Economy," Staff Report to the Federal Trade Commission, March 1974, p. 202.

S. Robert Mitchell, "Preliminary Economic Report on the Bituminous Coal Price Increase During 1970," March 1971, Exhibit 3.

Keystone News Bulletin, May 1974.

*Oil producer or company with oil producing interests

Another factor weakening competition has been the large number of mergers in the coal industry. Table IV.9 chronologically lists coal company acquisitions during the period 1959 through the first half of 1974. As may be seen, there have been a large number of acquisitions of coal companies during this period. Clearly, these acquisitions have caused concentration levels to be higher than they would have been had the acquisitions not taken place. Moreover, many of the acquisitions of coal companies have been consummated by oil producers or companies with oil producing interests. In fact, of the 65 acquisitions during this fifteen year period, oil firms accounted for 27, representing about 41 percent. Considering just the 1970's, the oil firms were responsible for about 42 percent of the total number of acquisitions of coal companies. Since two-thirds of all the acquisitions occurred in the past five years, it is significant that nearly half of these were accounted for by oil firms. On the basis of such figures, Joseph P. Mulholland and Douglas W. Webbink concluded that ". . . because petroleum company acquisitions of coal and uranium companies can be viewed as horizontal acquisitions, they definitely should be subject to antitrust review for possible anticompetitive effects."3/

At this point, it should be noted that it would also be desirable to provide data on coal reserves ownership and concentration similar to that available for coal production ownership and concentration. Unfor-

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3/ Joseph P. Mulholland and Douglas W. Webbink, "Concentration Levels and Trends in the Energy Sector of the U. S. Economy," Federal Trade Commission, March 1974, p. 263.

tunately, detailed information is not available from public sources. Even the limited data which are available appear ". . . to include only a small fraction of the reserves actually owned by coal companies and a much smaller fraction of potentially available reserves."[4/] There are, however, rough estimates of reserves owned by the top 17 companies. These estimates are reported in Table IV. 10. Obviously, outside control is substantial on coal's future reserves, as 16 of the top 17 holders are companies representing oil, railroad, steel, and metal interests.

4/ Ibid., p. 136.

TABLE IV. 10

Estimated Reserves of the Top 17 Companies

Company	Total Estimated Reserves (Billions of Tons)
Burlington Northern RR	11.0
Union Pacific RR	10.0
Kennecott Copper (Peabody Coal)	8.7
Continental Oil (Consolidation Coal)	8.1
Exxon (Montercy Coal)	7.0
American Metal Climax (Amax Coal)	4.0
Occidental Petroleum (Island Creek Coal)	3.3
United States Steel	3.0
Gulf Oil (Pitts. & Midway Coal)	2.6
North American Coal	2.5
Reynolds Metals	2.1
Bethlehem Steel	1.8
Pacific Power & Light	1.6
American Electric Pwr.	1.5
Eastern Gas & Fuel Assoc. (Eastern Assoc. Coal)	1.5
Kerr-McGee	1.5
Norfolk & Western RR	1.4
Utah International	1.3
Westmoreland Coal	1.2
Pittston Co.	1.0
Montana Power (Western Energy)	1.0
Standard Oil of Ohio (Old Ben Coal)	0.8
Ziegler Coal	0.8
General Dynamics (Freeman/United Elec.)	0.6
Rochester & Pitts. Coal	0.3
Carbon Fuel	0.1
Amer. Smelting & Refin. (Midland Coal)	0.1

Source: United Mine Workers Journal, July 15-31, 1973, p. 5.

Numerous firms have also initiated significant exploration efforts on Government owned coal lands administered by the Bureau of Land Management and the U. S. Geological Survey. At the time the Interior Department began freezing new leases for coal rights to federal lands in 1971, a total of 773,000 acres was under lease in the Great Plains states and the Southwest, and some of the biggest leaseholders to get in before the cutoff date were oil companies.

According to a recent study by the Council on Economic Priorities, a New York-based nonprofit research group, the top 15 of 144 leaseholders out of the 474 leases outstanding in seven western states controlled 70 percent of all the land under lease. Moreover, five oil companies--Continental Oil Co., Shell Oil Co., Sun Oil Co., Gulf Oil Corp., and Atlantic Richfield Co.--were in the top 15. Other leaders included five of the nation's 15 leading coal producers and three electrical utilities.5/

The large corporate lease-holders, the report said, "speculate the most," holding public coal unmined until prices go up. Only 11 percent of the 474 leases examined by the study group were under active production, and 321 leases "have never produced a single ton of coal."6/

All of the evidence presented thus far indicates that concentration in coal production is not only already substantial but will continue to increase

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5/ James G. Phillips, "Coal II: East-West Dispute," National Journal Reports, July 6, 1974, p. 1019.

6/ The Washington Post, May 1974.

in the future. In addition, many of the largest coal companies are now owned by other fuel companies or are captive producers owned by steel companies. But unlike the other fossil fuels, coal is not subject to production or pricing regulations, although it is being subject to anti-pollution and ecological regulations. As a result, the increasing degree of economic concentration taking place in the coal industry may be the missing factor which explains the recent perverse price behavior.

V. Summary and Conclusions

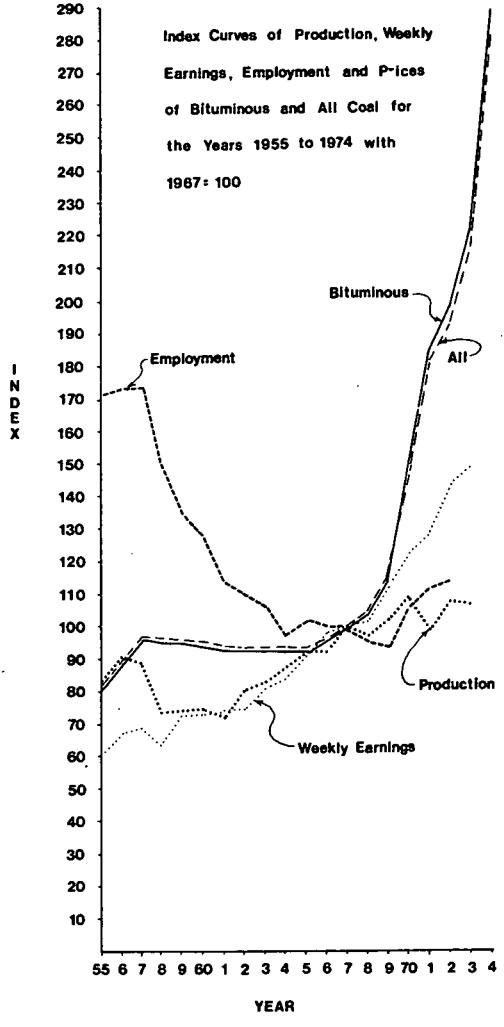
It is well-known that coal is relatively abundant in the United States. It is also well-known that coal, as a source of energy, is vital to the functioning of the economy, particularly in view of the scarcity of oil and natural gas. The price of coal is, therefore, extremely important, especially since electric utilities consume the majority of the coal output and increases in fuel costs to utilities are passed on to industry and consumers. Thus, rapid price increases in coal only worsen domestic inflation. Coal prices remained relatively stable during the period 1958-1968, but since that time enormous price increases have occurred. These price increases cannot be fully explained by increases in the cost of production, for unit labor cost increases are of much smaller magnitude than price increases. Nor do available data indicate that the coal operators were attempting to rapidly expand output, for the evidence indicates that in recent years the industry has operated substantially below normal capacity. These findings are summarized in Chart V. 1.

From the chart, it is evident that employment and output since 1967 have remained relatively constant. Admittedly, average weekly earnings have increased, but prices have risen far more dramatically. On the basis of Chart V. 1, one finds that output in 1971, 1972, and 1973 was below the level of 1970. It, therefore, cannot be argued that these price increases can be explained entirely by shortages of coal or by excess demand. A review of the available data on profits of coal companies and coal operating companies reveal tremendous increases in profits. Thus, price increases have been translated into profits.

The findings outlined above are not consistent with competitive behavior in the market for coal. If the coal industry were competitive, one would expect price increases to be accompanied by substantial increases in output and an attempt to satisfy demand by full utilization of available capacity. Although it is virtually impossible to prove conclusively that coal companies have entered into a conspiracy to raise prices and limit output, it should be noted that the findings of this report are entirely consistent with such behavior.

There is no doubt whatsoever that control of the coal output in the U. S. is concentrated to a great extent in the hands of very few companies. Furthermore, many of these companies are also engaged in the production of oil and natural gas. Thus, the markets for the substitutes for coal are controlled by many of the same companies which control the market for coal. As discussed earlier, the concentration figures do not indicate the true extent of economic power wielded by coal companies, for long-term contracts tie up much of the coal produced and, because of prohibitive transportation costs, the number of sources available to an individual buyer is extremely limited. Whereas the market for coal is tightly controlled on the seller's side, the reverse is true of the purchasers who deal with coal companies individually. Even though there are a larger number of small operators, much of the coal produced by these small companies is sold by brokers or even other large companies. Thus, the marketing of coal is more concentrated than production itself. Because

CHART V. 1



*Source Computed From Earlier Tables

We believe that an investigation of the coal industry with respect to pricing and supply policy is not only warranted in the light of the findings presented in this paper, but is also in the national interest.

James R. Barth

James T. Bennett

APPENDIX

Ownership of Coal Companies Producing
One Million or More Tons Annually

Coal Operating Company	Parent or Controlling Company	Primary Field or Parent or Controlling Co.
Affinity Mining Co.	Eastern Gas & Fuel Assoc.	Other
Alabama By-Products Corp.	Alabama By-Products Corp.	Other
Aloe Coal Co., Inc.	Pullman, Inc.	Other
Alumbaugh Coal Co., Inc.	Donovan Companies, Inc.	Other
Amax Coal Co.	American Metal Climax, Inc.	Metal
American Coal Co.	Utah Power & Light Co.	Utility
Amherst Coal Co.	Amherst Coal Co.	Coal
Amigo Smokeless Coal Co.	Pittston Co.	Other
Arch Coal Co.	Ashland Oil Co.	Oil
Arch Mineral Corp.	Ashland Oil Co.	Oil
Armco Steel Corp.	Armco Steel Corp.	Steel
Ashland Mining Corp.	Sovereign Pocahontas Coal Co.	Coal
Badger Coal Co.	Pittston Co.	Other
Barbour Coal Co.	Barbour Coal Co.	Coal
Barnes & Tucker Co.	Alco Standard Corp.	Chemical
Baukol-Noonan, Inc.	Baukol-Noonan, Inc.	Coal
Beatrice Pocahontas Co.	Occidental Petroleum and Republic Steel	Oil, Steel
Belva Coal Co.	International Mining & Petroleum	Oil
Benjamin Coal Co.	Benjamin Coal Co.	Coal
Beth-Elkhorn Coal Corp.	Bethlehem Steel Co.	Steel
Bethlehem Mines Corp.	Bethlehem Steel Co.	Steel
Big Horn Coal Co.	Peter Kiewit Sons Co.	Other
Big Mountain Coal, Inc.	Armco Steel Corp.	Steel
Bishop Coal Co.	Continental Oil Co.	Oil
Black Creek Coal Sales Div.	The Drummond Co.	Coal
Blackwood Fuel Co., Inc.	Belco Petroleum Corp.	Oil
Blair Fork Coal Co.	W. R. Grace Co.	Other
Blue Diamond Coal Co.	W. R. Grace Co.	Other
Bradford Coal Co., Inc.	Bradford Coal Co., Inc.	Coal
Buckeye Coal Co.	Youngstown Sheet & Tube Co.	Steel
Buckeye Coal Mining Co.	Keller Steel Co.	Steel
Buckhorn Hazard Coal Corp.	General Energy Corp.	Other
Buffalo Mining Co.	Pittston Co.	Other
Burgess Mining & Construction	Burgess Mining & Construction	Other
CF&I Steel Corp.	CF&I Steel Corp.	Steel
C & K Coal Co.	Gulf Resources & Chemical Co.	Chemical
Cannelton Coal Co.	Cannelton Industries, Inc.	Steel
Canterbury Coal Co.	Westrans Industries	Other
Carbon Fuel Co.	Carbon Fuel Co.	Coal
Cedar Coal Co.	American Electric Power Service Corp.	Utility
Central Appalachian Coal Co.	American Electric Power Service Corp.	Utility
Central Coal Co.	American Electric Power Service Corp.	Utility
Central Ohio Coal Co.	American Electric Power Service Corp.	Utility

Coal Operating Company	Parent or Controlling Company	Primary Field or Parent or Controlling Co.
Charter Coal Corp.	Gulf Resources & Chemical Corp.	Chemical
Cimarron Coal Corp.	Cimarron Coal Corp.	Coal
Clinchfield Coal Div.	Pittston Co.	Other
Clintwood Mining Co.	Sovereign Pocahontas Coal Corp.	Coal
Colowyo Coal Co.	W. R. Grace Co.	Other
Consolidation Coal Co.	Continental Oil Co.	Oil
Cravat Coal Co.	Cravat Coal Co.	Coal
Cumberland Collieries	Jewell Coal & Coke Co.	Coal
Decker Coal Co.	Peter Kiewit Sons Co.	Other
H. E. Drummond Coal Div.	The Drummond Co.	Other
Duquesne Light Co.	Duquesne Light Co.	Utility
Eads Coal Co.	Ashland Oil Co.	Oil
Eastern Associated Coal Corp.	Eastern Gas & Fuel Assoc.	Other
Eastern Coal Corp.	Pittston Co.	Other
Eastover Mining Co.	Duke Power Co.	Utility
Elkay Mining Co.	Pittston Co.	Other
Falcon Coal Co., Inc.	Falcon Coal Co., Inc.	Coal
Florence Mining Co.	North American Coal Corp.	Coal
Freeman Coal Mining Corp.	General Dynamics Corp.	Other
Fresno Coal Corp.	General Exploration Co.	Other
Gabriel Valley Enterprises	General Energy Corp.	Other
Gateway Coal Co.	Jones & Laughlin Steel Corp.	Steel
Gibraltar Coal Corp.	Kennecote Copper; American Metal Climax	Metal
Greenwich Collieries Co.	Pennsylvania Power & Light Co.	Utility
Harman Mining Corp.	Sovereign Pocahontas Coal Co.	Coal
Harmar Coal Co.	Continental Oil Co.	Oil
Hawley Coal Mining Corp.	Belco Petroleum Corp.	Oil
Helen Mining Co.	North American Coal Corp.	Coal
Helvetia Coal Co.	Rochester & Pittsburgh Coal Co.	Coal
Industrial Mining Co.	Keller Steel Co.	Steel
Inland Steel Co.	Inland Steel Co.	Steel
International Harvester Co.	International Harvester	Other
Island Creek Coal Co.	Occidental Petroleum Corp.	Oil
Itmann Coal Co.	Continental Oil Co.	Oil
Jewell Coal & Coke Co.	Jewell Coal & Coke Co.	Coal
Jewell Ridge Coal Corp.	Pittston Co.	Other
Johns Creek Elkhorn Coal	General Energy Corp.	Other
Johns & Laughlin Steel Corp.	Jones & Laughlin Steel Corp.	Steel
Kaiser Steel Corp.	Kaiser Steel Corp.	Steel
Kellerman Mining Div.	The Drummond Co.	Coal
Kemmerer Coal Co.	Kemmerer Coal Co.	Coal
Kentland-Elkhorn Coal Corp.	Pittston Co.	Other
Kentucky Carbon Corp.	Carbon Fuel Co.	Coal
Kerr-McGee Coal Corp.	Kerr-McGee Corp.	Other
King Knob Coal Co.	King Knob Coal Co.	Coal
Knife River Coal Mining Co.	Montana Dakota Utilities	Utility
Kristianson & Johnson Coal Co.	Westrans Industries	Other
Majestic Collieries Co.	Sovereign Pocahontas Coal Co.	Coal
Maple Meadow Mining Co.	Cannelton Industries, Inc.	Steel
Marty Corporation	Marty Corporation	Coal
Mathies Coal Co.	Continental Oil Co.	Oil

Coal Operating Company	Parent or Controlling Company	Primary Field or Parent or Controlling Co.
Mead Corporation	Mead Corporation	Other
Midland Coal Co.	American Smelting & Refining	Metal
Midway Coal Co.	Pullman, Inc.	Other
Monterey Coal Co.	Exxon Corp.	Oil
Mountain Drive Coal Co.	Mountain Drive Coal Co.	Coal
Nacco Mining Co.	North American Coal Corp.	Other
National Coal Mining Co.	Occidental Petroleum Corp.	Oil
National Mines Corp.	National Steel Corp.	Steel
Natural Bridge Coal Div.	The Drummond Co.	Coal
New River Coal Co.	Chessie System	RR
North American Coal Corp.	North American Coal Corp.	Coal
Ogleboy Norton Co.	Oglebay Norton Co.	Other
Ohio Coal & Construction Co.	Ohio Coal & Construction	Coal
Ohio Edison Co.	Ohio Edison Co.	Utility
Old Ben Coal Co.	Standard Oil Co. (Ohio)	Oil
Olga Coal Co.	Youngstown Sheet & Tube Co.	Steel
Oneida Mining Co.	North American Coal Corp.	Coal
Pacific Power & Light Co.	Pacific Power & Light Co.	Utility
Peabody Coal Co.	Kennecott Copper Corp.	Metal
Peter White Coal Mining Corp.	Belco Petroleum Corp.	Oil
Pikeville Coal Co.	Steel Co. of Canada	Steel
Pocahontas Red Ash Mining Corp.	Belco Petroleum Corp.	Oil
Pittsburg & Midway Coal Mining	Gulf Oil Co.	Oil
Princess Susan Coal Co.	Central Penn Industries	Other
Quarto Mining Co.	North American Coal	Coal
R&F Coal Co.	Gulf Resources & Chem. Corp.	Coal
Race Fork Coal Corp.	W. R. Grace Co.	Coal
Ranger Fuel Corp.	Pittston Co.	Other
Republic Steel Corp.	Republic Steel Corp.	Steel
Rochester & Pittsburgh Coal	Rochester & Pittsburgh Coal	Coal
Rocky Mountain Energy Co.	Union Pacific: Ideal Basic Ind.	Other
Rosebud Coal Sales	Peter Kiewit Sons Co.	Other
Rushton Mining Co.	Pennsylvania Power & Light	Utility
Sahara Coal Co.	Sahara Coal Co.	Coal
Scotia Coal Co.	W. R. Grace Co.	Other
Semet Solvay Div.	Allied Chemical Corp.	Chemical
Sewell Coal Co.	Pittston Co.	Other
Shamrock Coal Co.	Jewell Coal & Coke Co.	Coal
Slab Fork Coal Co.	Slab Fork Co.	Coal
Snap Creek Coal Co.	Pittston Co.	Other
Southern Appalachian Coal	American Electric Power Service	Utility
Southern Electric Generating	Southern Electric Generating Co.	Utility
Southern Ohio Coal Co.	American Electric Power Service	Utility
Southern Utah Fuel Co.	Coastal States Energy Co.	Other
Southwestern Illinois Coal	Ashland Oil Co.	Oil
Sovereign Coal Corp.	Sovereign Pocahontas Coal Co.	Coal
Tunnelton Mining Co.	Pennsylvania Power & Light	Utility
Twilight Industries, Inc.	U. S. Natural Resources Co.	Other
Union Carbide, Ferroalloys Div.	Union Carbide Corp.	Chemical
United Electric Coal Co.	General Dynamics Corp.	Other
United States Fuel Co.	U. S. Smelting & Refining Co.	Metal
United States Pipe & Foundry	Jim Walter Corp.	Other

Coal Operating Company	Parent or Controlling Company	Primary Field or Parent or Controlling Co.
United States Steel Corp.	United States Steel Corp.	Steel
Upshur Coals Inc.	Alco Standard, Inc.	Chemical
Utah International Inc.	Utah International Inc.	Metal
Valley Camp Coal Co.	Valley Camp Coal Co.	Coal
Virginia Iron Coal & Coke Co.	Virginia Iron Coal & Coke Co.	Coal
Virginia Pocahontas Co.	Occidental Petroleum Co.	Oil
Walker-Fayette Coal Co.	Ashland Oil Co.	Oil
Washington Irrig. & Denlop. Co.	Pacific Power & Lt; Washington Water Power	Utility
Webster County Coal Corp.	Mapco Inc.	Other
Western Energy Co.	Montana Power Co.	Utility
Westmoreland Coal Co.	Westmoreland Coal Co.	Coal
Westmoreland Resources	Westmoreland Coal' Penna-Va Corp; Morrison-Knudsen; Kewanee Oil	Other
Wheeling-Pittsburgh Steel Corp.	Wheeling-Pittsburgh Steel Corp.	Steel
Windsor Power House Coal Co.	American Electric Power Service	Utility
Wyodak Resources Devel. Co.	Black Hills Power & Light Co.	Utility
Youghiogheny & Ohio Coal Co.	Youghiogheny & Ohio Coal Co.	Coal
Youngstown Mines Corp.	Youngstown Sheet & Tube Co.	Steel
Zapata Coal Corp.	Zapata Corp.	Other
Zeigler Coal Co.	Houston Natural Gas Corp.	Other

Source: Keystone News Bulletin, May 1974, pp. 5 - 6.