Code 1200 copy 4

NPC

DEPARTMENT OF INTERIOR

NATIONAL PETROLEUM COUNCIL

In the Matter of:

MEETING OF THE
NATIONAL PETROLEUM COUNCIL

Place Washington, D. C.

Date December 11, 1972

Pages 1 thru 111

Volume 1

HOOVER REPORTING COMPANY, INC.
Official Reporters
Washington, D. C.
546-6666

Petofi

Live
Tape

U.S. DEPARTMENT OF THE INTERIOR

NATIONAL PETROLEUM COUNCIL

MEETING

OF THE

NATIONAL PETROLEUM COUNCIL

9:00 a.m.,
Monday,
December 11, 1972

Presidential Ballroom
The Statler Hilton
16th and K Streets, N.W.,
Washington, D. C.

H. A. True, Jr., Chairman

Hon. Rogers C. B. Morton,
Cochairman

C O N T E N T S

P R O C E E D I N G S

MR. TRUE: Gentlemen, if you will take your seats, we will proceed.

The meeting of the National Petroleum Council will please come to order. We have a lot of business to cover this morning. I would like to begin by introducing the head table. In addition to our distinguished Government Co-chairman and our guest speakers, who I will introduce a little later, we have this morning, Hollis M. Dole, Assistant Secretary of the Department of the Interior for Mineral Resources. Hollis.

(Applause follows the introduction of each person.)

John G. McLean, Chairman of the Committee on U.S. Energy Outlook. John.

Wilton E. Scott, Chairman, Committee on Petroleum Resources Under the Ocean Floor.

Orin E. Atkins, Chairman, Committee on Factors Affecting U.S. Refining Capacity.

Warren B. Davis, Chairman, Coordinating Sub-committee of the Committee on U.S. Energy Outlook.

Vincent M. Brown, Executive Director, National Petroleum Council.

This morning, without objection from the floor, we will dispense with the formal calling of the roll in the interests of time and let the official check at the door

serve as the attendance roster.

Before I introduce Mr. Jake Hamon, I would like to say that any comments you council members may have from the floor will be most welcome. I draw your attention to the microphones in the center aisle and request that you use them. Please identify yourself for the official recorder before you speak.

I would now like to introduce Jake Hamon, Chairman of the Agenda Committee and former Chairman of this Council, to present a report of the Agenda Committee.

Mr. Hamon is an independent oil producer from Dallas.

MR. HAMON: Mr. Chairman --

MR. TRUE: Jake, do you want to use this mike, please?

MR. HAMON: This is all right. I am a kind of a little fellow, hate to walk up and down stairs, kind of clumsy, so I'm safer here. Thank you, though.

REPORT OF THE AGENDA COMMITTEE

MR. HAMON: Pursuant to a call for a meeting of the Agenda Committee by myself by telegram to the members on September 14th, 1972, and with the meeting and its agenda having the approval of Mr. Gene Morrell, Director, U.S. Office of Oil and Gas and Acting Government Cochairman of the Committee, the Agenda Committee met on September the 26th,

1972 at 12:15 p.m. in the Del Monte Lodge, Pebble Beach, California.

(1) Action was taken on a letter dated September 15th, 1972 from the Assistant Secretary of the Interior, Hollis M. Dole, to the NPC Chairman, Mr. H. A. True, Jr.

In order to assist the Department of the Interior in the continuing preparation for the scheduled 1973 Law of the Sea Conference, the Council was requested to prepare a further study which should consider the question of navigation in coastal waters and international straits and the question of security of investment in overseas and domestic offshore area. In conjunction with the latter, special attention was requested to the issue of compulsory settlement of disputes.

The Agenda Committee recommended that the additional analysis be undertaken -- which would supplement previous National Petroleum Council seabed studies -- and thus referred the request to the existing NPC Committee on Petroleum Resources Under the Ocean Floor as a continuation of the previous overall effort of that committee.

Because of this, no action was required on the part of the Council. However, copies of the request letters were sent to all Council members on October the 12th, 1972. A copy of this letter is attached hereto as Appendix A.

(2) At the same session, the Agenda Committee, at the request of the Department of the Interior, agreed to

recommend that the National Petroleum Council undertake a study of appropriate actions that could be taken in the event of serious interruption to important energy supplies, if Interior would fram a study request letter to indicate a three-month's interruption of generally current import levels.

This was done by a letter dated December the 5th, 1972 from Assistant Secretary Dole to Mr. True, requesting this Council to make a comprehensive study and analysis of possible emergency supplements to or alternatives for imported oil, natural gas liquids and products in the event of interruption to current levels of imports of these energy supplies. Where possible, the results of emergency measures or actions that could be taken before or during the emergency under present conditions should be quantified. For purposes of this study only, it is to be assumed that current levels of petroleum imports to the United States are reduced by denial of (a) 1.5 million barrels a day for a 60-day period and (b) 2.0 million barrels a day for a 90-day period.

It was requested that this study be completed as soon as possible with at least a preliminary report presented by July 1973.

As provided by the Articles of Organization of the Council, it was unanimously agreed to recommend

to this Council the appointment of a committee to undertake the study as requested by Assistant Secretary Dole. In complying with this request, the committee undertaking the study should not suggest plans or programs.

Mr. Chairman, that is the report of the Agenda Committee. To it I have the proper letters attached.

MR. TRUE: Thank you, Mr. Hamon.

Do I hear a motion to adopt the recommendations of the Agenda Committee?

(The motion was made and seconded.)

It has been moved and seconded. Is there any discussion?

All in favor?

(There was a chorus of ayes.)

Any opposed?

(The motion was carried.)

To present a report of the Nominating Committee I would like to introduce Mr. Carrol Bennett, Chairman of the committee. Mr. Bennett is Board Chairman of the Texas-Pacific Oil Company, Inc. and I would ask Mr. Bennett please to come up here.

MR. BENNETT: Aw, I've got a bad knee, Dave. Can't I stay here, too?

MR. TRUE: All right.

REPORT OF THE NOMINATING COMMITTEE

MR. BENNETT: Mr. Chairman, the meeting today is also the organizational meeting of the Council which under normal circumstances is generally held at an earlier date in the new Fiscal Year.

The Nominating Committee met in session yesterday and recommends to the Council that the present officers and members of the standing committees, namely, the Agenda and Appointment Committees, be reelected to serve until the next organizational meeting of the Council in 1973, as follows:

Chairman, Mr. H. A. True, Jr.

Vice-chairman, Robert G. Dunlop

The Agenda Committee, Chairman, Jake L. Hamon, Howard Boyd, Bob Birch, Maurice Granville, Frank Ikard, J. K. Jameson, W. W. Keeler, John M. Kelly, Harold McLure, Dean McGee, John Swearingen.

The Appointment Committee, Chairman Charles E. Spahr ~~Sporer~~, Perry Bass ~~Kerr-Bellas~~, Carroll Bennett, Allen F. Calvert ~~Coward~~, George Getty the second, B. D. Goodrich, Fred Hartley, Clyde McGraw, Charles Murphy, Bill Vaughey ~~Voy~~ and Rawleigh Warner ~~Raleigh Warren~~.

I move the adoption of the report as presented, Mr. Chairman, and for the election of the officers and members of the two standing committees for Fiscal Year 1973 as presented.

MR. TRUE: Do I hear a second?

(The motion was seconded.)

Any discussion?

All in favor?

(There was a chorus of ayes.)

Any opposed?

(The motion was carried.)

Thank you, gentlemen. I am pleased to be asked to continue to serve as the chairman of this council and will do everything I can to further the important work of the Council.

We now have a progress report from the Committee on Factors Affecting U.S. Refining Capacity. As you know, at the last meeting, the Council agreed to take on a study of the economic, governmental, technological and environmental factors which may affect the domestic refining industry's ability to respond to the demands for essential petroleum products that are made upon it.

Mr. Orin E. Atkins, Chairman of the committee, is here to give us a report on their progress. Mr. Atkins is Chairman of the Board of Ashland Oil. Orin.

REPORT BY ORIN E. ATKINS

MR. ATKINS: Mr. Chairman, Fellow Council Members, as Dave has indicated, this study was undertaken at the request of the Department of the Interior. A Main Committee

was appointed by the Council with Mr. Stephen Wakefield, Deputy Assistant Secretary of Mineral Resources, serving as Cochairman. The Committee is functioning through a Coordinating Subcommittee and three task groups. These include the Government Policy Task Group, an Economics and Environmental Task Group and a Facilities and Technology Task Group.

In addition to identifying the governmental, economic, technical and environmental factors affecting the domestic refining industry, the study committee is appraising the present and projected capabilities of the domestic refining industry to meet the anticipated demand for petroleum products and is analyzing the causes of the downtrend of domestic refining capacity in relation to demand.

The committee is also delineating the elements essential to a healthy domestic refining industry capable of meeting the nation's supply requirements.

The Government Policy Task Group is investigating various governmental actions that could induce increased domestic refining construction. In doing so, they are addressing themselves to the issues involved in the national security considerations, namely, import policy and spare capacity needs, policies as to LNG and SNG, balance of payments considerations, Cabotage Laws, such as the Jones Act, cargo preference legislation, foreign siting incentives and

and the effects of the demands of foreign host countries.

The Economics and Environmental Task Group is studying the reasons for the indicated shortfalls in domestic refining capacity including the economics of constructing on offshore and onshore refining sites and coastal versus heartland considerations.

Necessarily, this involves consideration of such factors as domestic and foreign income taxes, availability of financing, cost of fuels, cost of construction, site costs, problems of crude availability, assurance of future supply and the uncertainties surrounding United States import policies.

In addition, this task group is looking into the environmental considerations involved in new refining capacity with special attention to site availability, sulfur and lead removal and effluent controls.

The Facilities and Technology Task Group work is really in two parts. First, through a comprehensive questionnaire they are gathering data on present refinery capacity and conditions, domestic capacity under construction and planned and the historical trend of refining construction. This latter point includes construction, consolications and abandoned capacity.

With all of this data, the task group will make an analysis of capacity versus demand with particular attention

to the historical trend over the last five years and projections out to 1985 based upon the continuation of past and present trends.

The second part of the task group work is to update the refining material that was part of the National Petroleum Council report, "Impact of New Technology on the United States Petroleum Industry 1946 to 1966" which was issued in 1967. This part of the study will include an evaluation of the obsolescence of present refining capacity, uncertainty as to how to design new refineries and conversion of refineries to an alternate product slate.

Lastly, the group is looking into the transportation and storage facilities necessary for the operation and expansion of refining capacity.

Mr. Chairman, the work of the Coordinating Subcommittee is well on its way. The task groups are on schedule. We hope to have this report completed by late spring of 1973. Thank you very much.

MR. TRUE: Thank you very much, Orin. If there are no questions or comments, we have a special opportunity this morning to hear from General George Lincoln of the Office of Emergency Preparedness and we are honored at General Lincoln's presence. General.

REMARKS OF GENERAL LINCOLN

GENERAL LINCOLN: Honorable Chairman, members of

the National Petroleum Council, gentlemen and -- these lights prevent me from seeing anybody, but I hope, a few ladies. All of us need to join the women's lib movement these days.

Secretary Morton, last night told me it would be all right to take a few minutes to counsel with you on the problems which he and I share with a great many people here and that problem is assurance of adequate heating oil for the heating season.

Now, as most of you know, the emergency sign is on my door and so I grasped this opportunity to talk briefly to you who share the heavy responsibilities that no home is cold this winter.

I recall the first time I had the privilege of addressing this distinguished group. It was a little less than three years ago. It was just after publication of a report that a few here may still recall by a cabinet task force on the oil import program and I remember I was introduced by the then-chairman with a comment that I was a fellow who was very much on the minds of those here present and I was able to say, when I opened my remarks, that I noticed that the chairman had not said that I was very much in the hearts of those there present.

Well, I come to appeal to both minds and hearts. Most of us here are aware of the special situation about heating oil. Our economy has boomed and so have emissions

gadgets on cars with a consequent increased requirement for gasoline.

A year ago last August I was charged with the 90-day freeze and that froze gasoline prices high and it froze number two oil prices low and that situation for which no one, I notice, has asked the Price Commission formally for a change, certainly not for gasoline, people, I guess are thankful for their blessings. That situation, coupled with the high gasoline demand and, by the way, we figure that over 300,000 barrels a day of that has come from new environmental requirements, started us into the heating season with low inventories and I also recognize and so do other people that frozen prices are a disincentive to inventory building.

Heating oil production did continue to lag at the first part of this heating season and that heating season has thus far been colder than normal.

The Secretary of the Interior and I have, in several statements pointed out to the industry the problem we have to surmount and each of you who are refiners have received the weather bureau's 90-day outlook which, with a 60 percent reliability they say, foresees abnormally cold weather in the heating oil area through February.

Now, most of you here, I hope, are aware that the administration did, last Friday, relax import arrangements for heating oil to include lifting the Western hemisphere

restrictions on import of such oil by deepwater terminal operators.

In case you haven't seen the actions, I have asked that Friday's press release be made available to this gathering but all of you who are informed know that the heating oil requirement for this season is going to be met, has to be essentially met by the efforts of the refining and of all of the distribution portions of the industry.

In addition to studying the statistics and comments and some of them are conflicting, I've talked in the past two or three weeks to on the order of 100 people about the heating oil situation. Sometimes the discussions get a bit ad homonum and even accusatory but in this situation, we need to rise above that approach. The shared objectives for all of you so-called "majors" and "independents" is that no homes be cold this winter. Of course, the statesmanship which I do believe this industry possesses is to review production and distribution patterns so to assure that this is the case.

Now, there may be some special problems and one may be in the upper midwest temporarily where distribution patterns may not have adjusted to this new situation and where I personally observed, by the way, last Friday, that the weather was clear and abnormally cold. In fact, in minneapolis, I immediately noticed that in conserving their breeding stock, why, all the brass monkeys had been taken

indoors.

But I am sure that the great oil industry certainly has both the capacity and the resourcefulness to deal with this situation.

Following these recent alerts from the Department of the Interior and from my office, the reports do show an encouraging increase in refinery utilization and in heating oil production. That increase is not yet enough for adequate insurance so just have a look at the fellow next to you and share with him the knowledge and the responsibility that the country needs at least another four or five percent of heating oil production until -- at least until the Weather Bureau modifies its frosty outlook.

I have mentioned that I am aware of some concerns over price but many of you, not all, by the way, accept that the adequate supply is now the overriding objective and there is also the matter, I recognize, of crude supply. But the announced extension of 1972 allocations, coupled with permission to draw on them immediately, should deal with that matter.

There are a couple of other items which need mentioning, but in this short term situation and for the longer term. It just does not make sense to be burning heating oil for purposes which are not necessary. One of the problems is, of course, the input of new environmental

regulations and we are still a noncharted territory in this endeavor. When homes are threatened with cold, reviews of environmental aspirations should be quick by local and state governments to recheck the priorities.

There is another and related matter. Your industry should lead in energy conservation because you should know best how to conserve and in the tight situation for the foreseeable future you are going to sell all the heating oil you want to make in your refineries. Hence, you should be telling consumers how to conserve heating oil.

I have already, by the way, gotten my log cabin in Colorado rechinked and it helps. Energy conservation can make the difference this winter between the supply problem and a normal situation, despite the gasoline binge that we have been on. Energy conservation can give us the equivalent of several Prudhoe Bays, from which we have yet to get a barrel, before any middleaged petroleum executives here are retired. The country needs to seek a rising quality of life with less energy consumption and the energy people are likely to know best how to do it, so I ask that you join the crusade.

If utilities would quit peakloading with heating oil and encourage people to conserve in peak load times, the public interest would be better served in the immediate future and I hope that they are all urging conservation

during peakload periods, the same conservation that I urge to you.

Now, returning in closing to my main purpose, we have a heating season problem. It is to be solved by some increased production of heating oil, more than now quite practical, say my figuring people and it is to be doubly insured by successful conservation and environmental actions and I ask you to continue and to accelerate the effort as a first priority of management and I'll close by saying that I have confidence, based on the responses in the past and the responses thus far, in the adequacy of what is going to be done, and I do, again, express my deep gratitude for the opportunity to make this summary statement to this distinguished group.

Mr. Chairman, thank you very much.

MR. TRUE: Thank you very much, General Lincoln.

As Jake Hamon explained previously, the National Petroleum Council was asked to supplement its previous seabed study by examining the question of security of investment in overseas and domestic offshore areas and the question of navigation in coastal waters and international straits. Del Brockett had formerly been chairman of the Committee on Petroleum Resources Under the Ocean Floor. Since he has retired from the Council, I asked Wilton E. Scott to chair this committee and he agreed. Mr. Scott is Board

Chairman of Tenneco Oil. Scotty.

MR. SCOTT: Dave, Cecil Olmstead has been doing most of the work and will give the report on this committee this morning.

Cecil? There you are. Would you come up here?

MR. OLMSTEAD: I won't go any place Jake Hamon doesn't go.

(Laughter.)

REMARKS BY CECIL J. OLMSTEAD

MR. OLMSTEAD: Mr. Chairman, Governor Hathaway, members of the National Petroleum Council and guests. Coming back with a further report on this subject reminds me of the Guys and Dolls scene in which there was a view of the oldest permanent established floating crap game in Washington. That is the way I feel about coming back with another interim report on Seabeds and Law of the Sea.

We are delighted that Mr. Scott is going to chair the Main Committee on this subject. I've worked with him in other areas and I know anything he puts his hand to comes out well.

Secretary Hollis Dole of the Department of the Interior, by letter which Mr. Hamon read excerpts from, requested further study and report for use in preparation for the scheduled 1973 and 1974 Law of the Sea conference to be convened by the United Nations. You will recall that the

Council had responded to a prior study request to assist the Interior Department and other government departments in formulating their posture toward the development of petroleum resources of the ocean floor.

The basic NPC study was published in 1969. The supplemental report, issued in March of 1971, analyzed the U.S. draft treaty on the international seabed area which had been submitted as a working paper to the United Nations Seabeds Committee.

In the 1971 report, this Council endorsed -- without any elaboration -- certain principles contained in the President's statement of May 23rd, 1970 on U.S. Oceans Policy, including the integrity of investment, the compulsory settlement of disputes and the protection of the oceans from pollution.

The current request of the Interior Department seeks further study in three very specific areas. The first is navigation in coastal waters and international straits. The second is the security of investment in overseas and offshore areas, including the compulsory settlement of disputes.

The third area is pollution control and environmental conservation in offshore operations including marine transport and petroleum exploration and development.

Since these specific questions are being approached

as a matter of preparation for a law of the sea conference, the Legal Task Force of our committee was reactiviated to prepare drafts on each of the requested topics. This task force has met twice and its draft working papers on each topic are in advanced stages of preparation. I might say that group will meet again on Wednesday or Thursday of this week.

A conference and convention on the law of the sea will provide a distinct opportunity for achieving results which could be very helpful in solving the energy problems which face this country and the members of this Council.

The topics which the NPC has been requested to report further on are of the utmost importance to the efforts of the petroleum industry to supply adequate energy in the coming years. Improved stability of investment in foreign offshore areas, assured freedom of navigation and transport of oil and international pollution control requirements that are both realistic and reasonable could contribute substantially to solutions for the world's energy dilemma.

We hope, Mr. Chairman, that the NPC report in this area will make such a contribution. Thank you.

MR. TRUE: Thank you very much, Cecil. I understand that the -- here he comes now -- the distinguished co-chairman and Secretary of the Interior, Rogers B. Morton.

(Applause.)

Gentlemen, it is a real pleasure to me to introduce a gentleman who I am proud to say is a close personal friend of mine. He is also Governor of my state. He has served in this capacity for six years. He is now at the midpoint of his second term and he speaks to us today as immediate past Chairman of the Interstate Oil Compact Commission. Prior to being elected to the governorship, he had a distinguished career as a lawyer in Wyoming.

I am most pleased to present Governor Stanley E. Hathaway. Governor.

(Applause.)

REMARKS BY GOVERNOR STANLEY E. HATHAWAY

GOVERNOR HATHAWAY: Thank you, Mr. Chairman; Secretary Morton, Secretary Dole, distinguished members of the National Petroleum Council, it is indeed a pleasure for me to be a member of this body even though for a short time as my tenure ended as Chairman of the Interstate Oil Compact Commission in Houston last week. We appreciate the opportunity of being represented upon the Council and I sincerely hope that my successor, Governor Bruce King of New Mexico, may become a member of this body.

I am rather proud of the Chairman of this organization. He is one of the great independent oil operators in the country, I think, and in addition to his duties as chairman of this organization, he serves as

President of the Board of Trustees of the University of Wyoming and that takes a good deal of time. In between all these activities he has been able to discover a couple of new oil fields in the last three months, one in Wyoming and we are grateful for that.

If Senator Hanson is in the audience -- he was due to be here this morning -- I'd like to pay my respects to him. I think he is one of the most knowledgeable and articulate spolkesmen for energy problems in the United States' Senate. We are very proud of the contribution that he has made.

As you know, the Interstate Oil Compact Commission is dedicated to conservation. It has been in existence since 1935. It is made up of representatives of the regulatory bodies, Oil and Gas Conservation, 29 states, representatives of the oil and gas industry, and I think it has done a tremendous job over the years of assuring maximum recovery of oil and gas resources and I think their job will be even larger in the years to come with the necessity to conserve all of the resources that we can.

I would like to compliment this council and congratulate you on the quality of the Energy Outlook study. I have had an opportunity to read the summary of this study and I think it is an excellent basis for the making of decisions that have to made very soon now. I see that is one of the major domestic problems the President and his

administration has to deal with but I think that your study gives a firm foundation of options for the making of tough, hard decisions.

I would like to visit with you for a few minutes this morning about the energy outlook in one of the nation's 50 states as it relates to this study, as it relates to environmental problems, economic problems, water problems and political problems.

The State of Wyoming could be the energy capital of the nation. It ranks very high, as you know, on many energy resources. For example, we rank number one in coal reserves with an estimated 250 billion tons. We rank number one in the nation in uranium reserves, although not at this time in production. We rank no less than fifth in oil shale reserves -- or third, excuse me -- somewhere between Colorado and Utah. We rank fifth in the nation in petroleum production.

Five years ago I had my economic development department do a study on mineral resources. It was done by Cameron Engineers and they took a very pessimistic view of the future of the petroleum industry in Wyoming. They predicted that within five years we would sharply decline in petroleum production.

We have discovered three or four oil fields since that time and the total petroleum production in Wyoming

continues to rise and I suspect that our state is typical of many Rocky Mountain states that can make a great contribution in new energy supplies if the incentive is there for exploration and development and I think this would be a very poor time, for example, to reduce the depletion allowance or to attack, again, intangible drilling costs, because these matters seem important to me to encourage new exploration for oil and gas.

I have, Mr. Secretary, worked with three Secretaries of the Interior with respect to an oil shale policy and I believe you are finally going to get it off and running and we are encouraged about that.

These great reserves in Wyoming, Utah and Colorado could go a long way to solving our problems. In my judgment we will not really find out what all of the environmental problems are, or the economic problems, until we actually have some developmental projects, until someone is actually mining oil shale or taking oil from the ground by the in situ process and I really hope that in the next two or three years we will see these kind of developmental projects.

With respect to uranium, despite the need for more nuclear power plants, we have had a uranium mine shut down in Wyoming in the last six months because of the low price of the yellowcake and I suspect that a great more uranium reserves can be found in Wyoming if the incentive is there

to drill the holes and to develop these resources.

In the matter of coal, we thought coal, King Coal, was dead in Wyoming a few years ago when the steam engines stopped using it, but our coal production has about tripled in the last five years and projections estimate that we will be mining as much as 150 million tons by the year 1990 and that causes some of the environmentalists in my state to get uptight because they think we are going to be disturbing the entire surface of Wyoming.

We projected that if we did mine 150 million tons of coal for 50 years, we still would have touched less than one-half of one percent of the state's surface and we think we can rehabilitate that with surface mining reclamation.

The environmental problems are tough but I don't think they are unsolvable and I tend to think that a lot of politicians have overreacted to those radicals in the environmental movement who believe that we can completely shut down the American economy and that we should not have any more development.

We are proud of our environment in Wyoming. We think that we can develop the resources and protect the environment at the same time; despite those who talk about the merciless killings of eagles and coyotes and et cetera in Wyoming, we are also proud of our wildlife and we have as much of it as any state in the nation.

As the Secretary knows, the sheep people are a little uptight. They have all got bumperstickers on their cars now that say, "Eat Lamb, 20,000 Coyotes Can't be Wrong."

(Laughter.)

But it seems to me that with adequate environmental controls, the nation can claim these resources and we still can protect the purity of the air and the water. That has been the goal of my administration and we passed an Air Quality Act in 1967 and we had Air Quality standards before the Federal Government did. We have been working on water quality for 15 years. We really have no severe water quality problems.

In 1969 we passed the Surface Mining Reclamation Law, one of the first in the West. It requires the sloping of the sides of stripmined areas. It requires the removal and replacing of top soil. It requires revegetation. The Federal Government does not yet have a stripmining law but I am sure that they will soon. We think that we are on top of the problem and in a state that is going to see a lot of strip mining.

Well, one of the real key factors in all of this business is the matter of water. I think your report is probably a minimal on the potential of coal to gas conversion. This resource, the technology is now here and it could be developed very rapidly but if it is going to be developed in

states like Wyoming and Montana, the first and largest problem is that of an adequate water supply. They tell me it takes about 8,000-acre feet in consumptive use for a coal to gas conversion plant. It takes about 25,000 acre feet for a 2,000-megawatt power plant.

The coal resources in Wyoming -- Northeastern Wyoming and Southern Montana lie in a very arid area. Despite the fact that the Northwest power study indicates that there will be 10 10,000-megawatt power plants in the Powder River Basin by the Year 2000, there isn't any way that that could happen without some transmountain diversion of water. That means bringing water from the Big Horn River and the Yellowtail Dam over into the dry areas of Northeastern Wyoming and Southern Montana.

I congratulate Secretary Morton and his staff for initiating a total resource study of this area which I sincerely hope will include a serious study on the water problems.

I believe that we can solve the air pollution problems, that the technology is now present to permit either coal-to-gas industries or new power plants to meet air quality standards. The water problem does not seem to be severe -- the water pollution problem, that is -- and I think that the surface mining reclamation problems could be solved. But unless we are ready to lay out a billion dollars or so

for pipelines and facilities to bring water into those kinds of dry basins, we really won't see full utilization of the coal resources and I am encouraged that Interior is leading the way in a study that will study all of the resources of this area, study the environmental problems and the problems of agriculture and, hopefully, find a way to be a catalyst for bringing in the water supplies that will be necessary.

We are like most states. We have a lot of people that speak out pretty loudly and sometimes rather abusively and arrogantly about the environment. I consider myself an environmentalist. If I were to take action in my state government that destroyed the quality of our air or water, I would be doing a disservice to the charge that I have.

But it seems to me that we must find the balance and the route to travel between those in the environmental movement who would care less about any development or any real care about the energy problems of this nation, and those who would exploit without taking proper care of the environment.

That is a tremendous challenge, I think, perhaps the challenge of this decade, to find a way that this nation can develop its resources, fulfill its needs without deteriorating its environment.

It would be helpful in the case of one energy state to have the Federal Government speak out a little more

clearly on solving the energy needs. For example, we have a project in Wyoming that is scheduled to go off in the next year called the "Wagon Wheel," nuclear stimulation of natural gas and the people in the county where the Wagon Wheel is located are up pretty tight about it and no one has really told them that this experiment is necessary. No one has told them that it should be done for the benefit of the nation and those people are red-blooded Americans just like we all are and if they thought that it was really making a contribution to the nation's energy crisis, they would look at it in a much different fashion. Instead, they look at it somewhat in the line of exploitation by a private industry.

The same sort of feeling exists in people in an area that may have a gaseous diffusion plant, a uranium enrichment plant. If the Federal Government said, "We need to have a uranium enrichment plant and this looks like a good location for it," the local people would take a much different outlook on that.

The real problem in a state like mine, with a small population, is the fear of being overrun with people. We only have 340,000 people and we throw in a few antelope and deer to get that count. So they don't really want anyone else to come to the state. They'd just be satisfied, most of them, if our population stayed the same. Some of them would like to see it drop. So when they hear of plans, for

example, to have a gaseous diffusion plant that might bring in 5,000 new employees, they get uptight about it and here is the area that I think the state and local government needs some lead time as well as industry. We need to know about when a plant like this is going to come on the line, when construction workers are going to come in. There have to be plans made for educational facilities, for health facilities, for housing and these problems can only be solved with planning and we have to have some dates and some decisions to do that planning well but I am convinced and I sincerely hope that we can speed up our domestic production of energy.

I got a little uptight myself when I went to Russia last year and found out that they expect to be totally self-sufficient in energy within the next five years. And I worry a little bit about spending $40 billion over there to bring liquified natural gas to this country. If it is really going to cost $1.50 a foot, they tell me that is less than the price we can produce gas from coal conversion. So it seems to me that we have some domestic priorities here that could be set to increase our own potential.

You have done a magnificent job in laying groundwork for all this that must be done in the study that you have initiated. I congratulate you for it. I congratulate the Secretary for his efforts.

Let me assure you that one of the nation's energy

producing states is ready to do its share.

Thank you very much.

MR. TRUE: Thank you, Governor Hathaway. I am sure you gentlemen can understand why we in Wyoming are so proud of our Governor.

It is now my pleasure to introduce the distinguished Government Cochairman of the National Petroleum Council, the Honorable Rogers C. B. Morton, Secretary of the Interior.

Mr. Secretary.

(Applause.)

REMARKS BY THE HONORABLE ROGERS C. B. MORTON

HONORABLE MORTON: Thank you very much, Governor Hathaway and Dave and officers of the Council, Hollis, Gene, and gentlemen.

Last night I had a great opportunity and it was a great privilege to present an award for distinguished service to Hollis. I'd also like to say and add this morning that we are very proud of the service that Gene Morrell has given to the Department in his capacity as head of the Office of Oil and Gas and he has done a real great job. We would like to keep him around but I understand that there are bigger and better things in the future in store for him and, in whatever capacity, Gene, all the luck in the world.

We seem to run in cycles in my life. I remember once when I first started farming it was just about the time

the tractor was beginning to dominate the scene and the mule and the horse were phased out and I had an old river bottom farm that I bought for $18 an acre. I'd be glad to buy it back for that today. I raised corn on it and the soil was fairly heavy and I had a one-horse riding cultivator that was made by B. F. Avery and Company in Louisville and it worked pretty well until when we got into the heavier soils away from the river and then it was about all one mule could do to move it through the ground and I decided to try to go out in the country and buy a mate to the mule that I had and that was one of the finest mules I think I ever did own. He was a she-mule and in mules that doesn't really make a hell of a lot of difference.

And it was a sort of a dapple grey and stood about 17 or 18 hands high and was really quite an animal. One of the interesting things about her was that when she pulled a rastus plow through tobacco, she never stepped on a plant. Se was probably one of the first great environmentalists.

She was most careful about how she disturbed the environment and as a result, was sought after by all my neighbors to work their tobacco when the plants were young and tender.

I went up to the Bluegrass section of Kentucky and I heard about a dapple grey mule. There is something about mules that they do better if they both are the same color

when you work them together. This dates way back before the Civil Rights Act of 1964 but nevertheless, it's kind of nicer, too, for the mule driver.

I heard about this mule and I heard about the man that owned him and I went to see him. I drove my pick-up truck up there and -- which was extended with racks and everything so that I could haul a mule if I was able to buy one. And this was the best-looking mule I ever saw. It was a great big strong mule and I took him out and he had a single-tree gagon and we hitched the mule up to the single tree and I worked the mule, backed the mule, turned the mule. He responded perfectly and finally I said to the farmer, I said, "How much do you want for this mule?" He said, "I'll take $50 for him."

Well, I should have realized the situation that I was in and gotten in my truck and driven off, but I was kind of new at the game. A mule ought to have brought about $300 on that market.

I bought the mule and after I paid the man two $20 bills and a $10, I said, "Now, I bought this mule for $50. It should be a $300 mule. What's wrong with it?" He said, "Well, he don't particularly go along with other mules."

(Laughter.)

But he was an industrious mule and he was the kind of a mule that wanted to keep going and I noticed when he

was going down the edge of the field where I was driving with that wagon, he wasn't concerned about whether he ran over the first corn row or not and I thought, well, I've got a mule that will be a very good teacher for him to teach him not to step on the corn, not to step on the tobacco and go down between the rows.

So I called him Shelicon and I bought him to come back and work with Buttercup and I took seriously what the farmer said, but I had a tenant who was an extremely good teacher of mules and really sort of felt that he had a genetic kinship to them and if you looked at him carefully, you'd see what I mean.

So I brought the mule back and the tenant, named Buster, fell in love with this new mule and said, "We've really got us a team, ain't we?" I said, "We really got one." I said, "The only thing I can tell you is that this mule is not supposed to get along too well with other mules and you might be a little careful in how you hitch these two mules together for the first time."

He says, "Think nothing of it, boss." He said, "I'll work this mule with this cultivator by himself awhile and get him good and tired and then, I know how to handle mules, I think like a mule myself and I will be able to communicate sufficiently in order to get these two mules working in harmony to pull this cultivator through the

heavy soil and cultivate the crop which is necessary to keep this farm going."

About a month later, I went up to farm. I got a three-day pass from the place where I worked and I went to the farm and I couldn't find Buster. I couldn't find either mule. I saw a rather sizeable hole kicked in the side of the barn and I saw some scrap iron scattered around in the place where we formerly kept that riding cultivator. Nobody was there.

So I went back up the hill to the little town where the fellow up there who was the jack-of-all-trades, he ran the general store, did a little embalming on the side, barbershop work and a little legal counsel, sort of, in a moonlight fashion. He was playing pool when I arrived and I said, "Jake, I want to find out some information." I said, "Where is Buster?" He said, "Well, he went to Carrollton to the clinic. He got hurt a little bit in a little accident down to the farm." And I said, "Well, what happened down there? I went down there and couldn't find my livestock and couldn't find the cultivator." He says, "Where in the hell were you when Buster hooked them two mules together?" Well, I said I was at Fort Knox, but it didn't work.

And that is about what we have got now with the energy industry and the environmentalist. Have you ever thought about that? I have, and I've laid awake nights

thinking about it and I couldn't agree more with Governor Hathaway and his statement that we must seek a balance and, of course, you have heard me say this many times and one of the great articulators of that concept was the late Dr. Pecora, whom we miss terribly at the Department. He spent his life seeking the balance that we need.

I think that what I would like to do this morning is in no way trying to preempt the President's Message to the Congress which will soon be forthcoming and will soon be before us all to look at in terms of the goals we should reach for in the oncoming shortterm as well as longterm in the whole energy field.

First, I would like to thank you for your report, "The United States' Energy Outlook," which I think is going to be one of the historical reports ever issued by this Council. I am looking forward to really studying it and studying the recommendations that are in it so that we can see if we are on the same track, and I think we are and we can see what is involved in the implementation of new policies and new actions that will make something actually happen on the ground.

I'd like to just take a swing at some policy issues that we are trying to put together in such a way that they can be translated and transmitted and communicated to

all of our constituencies, the public, the energy industry, other elements of government and so on. We are not interested in encroaching on the private sector as you know but we are committed to the public interest and this in itself will require sensitive orchestration and a keen sense of balance.

We are not interested in impinging on the integrity of the environment but we are absolutely committed to social and economic progress.

I think the other day the President said a very cogent thing and I would like to quote it. He said, "I do not consider the election to have been an endorsement of the status quo. That is completely contrary to the American tradition." He said, "This is not a standstill country. It is a go-ahead country. It is our tradition from the beginning. The American people are never satisfied with things as they are. The American people want change. I think they want change that works, not radical change, not destructive change," he said. "But change that builds rather than destroys."

I think it has become indelibly factual that any massive movements that we make to change the relationship between the works of man and the environment will consume not only dollars but will consume the utilization and further conversion of energy. Nobody has got a magic wand to make substantive changes in the atmosphere or in the land and

water environment of the crust of the earth without using substantial energy. Some of this will be applied in the reinvestment phase of new technology by substituting new processes for old, by doing things a different way and this, of course, requires energy.

Some of the safety valves that we are constructing are energy-users and I am disturbed about them. For example, if an automobile takes 20 percent more gasoline in order to not pollute the air to the extent that it did before, it looks as though to me we have robbed Peter to pay Paul.

Now, I realize that in the short term, for the gasoline vendor, this is maybe not his chief concern, providing he can get plenty to sell, but over all, looking at it from a custodial point of view, this seems to me to be setting up a trend in the wrong direction.

I am deeply concerned that we are not coordinated enough in the development of use and of supply and demand aspects of an energy policy so that we are proceeding down the road to development of technologies soon enough which do not rob Peter to pay Paul. For example, we are in the desalting business and we are building a desalting plant in Orange County, California that is going to be fired by natural gas.

This concerns me. Here we are taking a finite resource to convert another unlimited resource and I would

consider salt water in fairly good supply on the planet -- in order to produce and end product that is usable for household, industrial or M and I water.

Now, there is something about that combination that scares me. We have moved through the last 200 years in the development of this country to a threshold where we are looking from a room of superabundance where the supply problem totally has never been considered a problem other than in the short term, other than in the development of distribution systems to use that supply and marketing systems to sell that supply.

We have never really thought of it as being finite. Sure, nobody would say that there wasn't a limit to the amount of oil or gas or coal but we have never thought of it in those terms. We have thought of it in the terms of development which has been right. We have thought of it in terms of distribution and marketing.

Now we are looking into a room where the dimensions are finite and where there is a severe imbalance between the amount of the different energy sources. Now, I think it is absolutely right that we proceed down the road of the development of sophisticated technologies, technologies in the use of geothermal steam, technologies in the use of -- certainly in the development of oil shale which, as Governor Hathaway said, we are trying to get at now as a

development of the more esoteric and sophisticated uses of solar energy, of new ways to make electricity that are more efficient and new ways to transport electricity more efficiently, new ways to do a lot of things.

But no matter how you cut the mustard, your children, my children and our grandchildren, during the end of this century or the last quarter of this century and certainly the first 30 or 40 years of the next century are going to be wholly dependent on the use of fossil fuels and it looks to me, and I don't have a Ph.D. in economy, but it looks to me like the smart thing for the United States to do is to develop a very strong energy base for the next 50 years domestically so that we don't sell out our energy industry in main street America to foreign capital.

(Applause.)

And we can do this. Governor Hathaway has said that the State of Wyoming is first in coal and it is, in terms of reserves. If these reserves are heavily drawn upon, obviously the center of gravity of energy will move from one place to another and will cause certain economic and social changes in the areas where this coal is extracted and in the areas where it is further processed.

I think we have got to bring the Alaskan pipeline into being as soon as we possibly can, and here is where it stands today. We are in the Court of Appeals as most of you

know, looking forward to a decision in the few weeks ahead of us, hopefully before the end of this year and I am in hopes that we are going to find a favorable decision but if we don't, of course, we will have to go to the next higher court, which is the Supreme Court.

As I look at the problems of the Arctic in Canada and have read the articles that have come out of Canada concerning the difficulties that lie ahead in the development of even a coal gas pipeline to bring Arctic gas into the marketplace of the lower areas of the continent, I am fortified in my own conscience as to the rightness of the decision that we made to go with the Alaskan route.

I hope that the judges feel the same way because I think I would hate to lose one more year of construction season if it is not absolutely necessary to begin to augment our domestic supply with the great domestic reserves which we have in the Alaskan Arctic.

I think we have a few things to yet resolve as far as the companies themselves are concerned in the techniques that we are going to use to administer the stipulations and the controls, the environmental controls, but they seem to be all areas where a good, sound commonsense approach of two people trying to get the job done together can take.

Hopefully, we will see, in Canada, an effort put together by joint venture from Canadian and American sources

a plan for and a beginning and a construction of coal gas pipeline.

I think in order to develop a decent energy base, we have got to put it all together. It will require certainly changes in the economic incentives that are necessary to bring more gas into production. As you know, we are thinking about methods by which gas can be deregulated and more equity between the wellhead price of gas on a Btu basis and oil, for example, can be equated and which will result in the production of more gas, the exploration and production of more gas.

I cannot agree more with Governor Hathaway when he says that those economic incentives must be there. For some reason, there is a feeling in the public, probably transmitted to the public by people who try to oversimplify in their reporting that the depletion allowance or the use of direct cash flow for investment into the ground and further exploration is somehow kind of a sinful special interest beneficiary.

I don't know whether it is the oil industry's fault or the government's fault or the Department's fault or whose fault it is that this is not better understood. The name depletion allowance in many circles is a dirty word. Economic incentives are always classified as loopholes. The think I can't understand is how people are willing to grasp

at those concepts and at the same time realize that everything we have, this building, these lights, their home, their car, their mobility, is dug out of the earth. It all comes from the earth. And if we don't have an orderly process for developing the earth's resources, we will inevitably erode and deteriorate a civilization which has reached for more people than any other civilization in history in terms of a percent of the whole, a quality of life never before achieved on this planet.

Now, if we are going to continue to provide an enhanced opportunity for a better quality of life, it seems to me that an orderly, well-planned system of developing our resources must be kept in being and that really is the challenge that is before this Secretary as far as our involvement in this whole energy and resource development spectrum is concerned.

I think we have all got a job to do. We have grown like Topsy. We have not had the land-use planning that we should have had and as a result we some unmanageable urban and suburban areas that are difficult to govern. As a result we have not kept pace with the restoration of disturbed areas to the extent that we could have economically, but there never was a demand to do it and now there is.

So let's put our heads together. Let's make sure that the environmental crisis doesn't generate an even

more acute energy crisis by bleeding off the development and rate by which resources should be developed to serve this civilization. I think we can do it and I think we can do a better job working together in the area of education of the public so that they understand the facts.

Nobody is trying to deceive anybody of anything. Nobody is trying to cover up the fact that an open pit mine across my old native state of Kentucky or Tennessee or Virginia or Wyoming or the desert of New Mexico or Arizona or Pennsylvania is an eyesore. It is not in the interest of best conservation. But there is an opportunity now to go with another ethic that will reclaim these areas within an economic framework if we are not asked to do everything overnight so that those lands will be again usable in a second form for recreation, for housing, for future industrial sites and all the rest.

There is no question about the fact that we cannot continue dumping effluents of a toxic nature into the watersheds. We are going to have to change that and we are beginning to change that. But let's do it with orderly investment within the range of our capabilities and not suddenly find ourselves strapped from the opportunity to make developmental and exploratory investments in the ground because the cash is not there and I think we can do that and in the end, say a decade from now, we will have cleaner air,

cleaner water, a profitable industry and we will be back on the road to the development of a domestic energy base that will be a good mix based on the resources that we have and will give us the opportunity for social and economic growth and the enhancement of a quality of life.

If we will accept those commonsense policy projections, if we will work together in trying to educate people as to the facts not to persuade the people away from cleanliness or away from disorderliness or away from dirty air or dirty water or however you want to express it but, conversely, develop with them a way to go to produce those kind of results and at the same time maintain the viability of the greatest economy on earth, we will have done for ourselves and future generations a great service. Thank you.

(Applause.)

MR. TRUE: Thank you, Mr. Secretary. Today, as always, we deeply appreciate your taking your time to be with us at these meetings and we certainly thank you for your most appropriate remarks this morning. The Council looks forward to continuing to work with you and I personally look forward with considerable pleasure to serving as cochairman of this Council with you.

The Committee on U.S. Energy Outlook, which has been composed of over 200 representatives of oil, gas, coal, nuclear and other energy-related fields and a number of

financial experts including able government representatives, has been conducting a comprehensive energy study for the past two and a half years. I would estimate they have, in turn, been assisted by an additional 1,000 energy industry technicians and this committee has now completed its assignment and adopted its full report at a meeting held yesterday.

Mr. John G. McLean, chairman of the Committee on U.S. Energy Outlook, is here to give the Council a presentation of the committee's findings with the assistance of Warren B. Davis who has chaired the Coordinating Sub-committee. Mr. McLean is the board chairman of Continental Oil Company. Mr. Davis is director of economics of the Gulf Oil Corporation. Mr. McLean.

REPORT OF THE COMMITTEE ON U.S. ENERGY OUTLOOK

MR. MC LEAN: Mr. Chairman, Mr. Secretary and members of the National Petroleum Council, it is our pleasure to present to you at this time a summary of the report by the Committee on the U.S. Energy Outlook. Subject to your approval, the report will be published by the Council in three sections. First, a summary of the report will be published in the form already distributed to you as the report of the National Petroleum Council and we are recommending your approval of this summary today.

Second, the full report will be published in a

separate, much larger document as the report of the Council's committee on the U.S. Energy Outlook.

The Main Committee unanimously approved this full report yesterday afternoon.

Third, the detailed studies of the various task groups will be published about April 1st, 1973 as a collection of separate documents. This morning we will give you an overview of the entire project. Attention will be directed to the findings of the study, the implications of those findings and, third, recommendations for a national policy to achieve an improved energy posture.

This presentation will also be published at a later date as a short guide to the entire study. The presentation will require about an hour and a half and will make use of about 40 slides. I will present certain parts of the material. Other sections will be handled by Mr. Davis, the chairman of the Coordinating Subcommittee. This subcommittee, under Mr. Davis' leadership, has been the working group responsible for implementing the policy decisions of the Main Committee, coordinating the work of the several task groups and drafting the committee's reports.

In January, 1970 the Department of the Interior asked the National Petroleum Council to undertake this comprehensive study of the U.S. Energy Outlook from now to the end of the century. Three basic questions were implicit

in that request:

How much energy are we going to need?

Where are we going to get it?

And what changes in government policies or economic conditions would contribute to an enhanced national energy posture?

In July, 1971 the Council issued an interim report. This initial appraisal assumed that 1970 government policies and regulations and the economic climate in the energy industries would continue without major change in the 1971-1985 period.

The initial appraisal was not designed to be a forecast of what would occur in the future. It was a set of projections based on optimistic assumptions of what could occur without major changes in political and economic climate.

Total energy demand in this appraisal was projected to increase 4.2 percent per year from 1970 to 1985, reaching a level of 135 quadrillion BTU's at the end of the period. Foreign energy supplies were projected to rise from 12 percent of total supply in 1970 to 30 percent in 1985.

The findings of the initial appraisal demonstrated the significant changes in the economic climate and government policies are essential if the present trend toward tightness in U.S. indigenous energy supply is to be

substantially altered.

The findings of the initial appraisal were therefore used as a point of departure for appraising how various changes in government policies and economic conditions might affect future energy requirements and availability.

Now, this second and final stage of this study which we are now submitting to you has been considerably more commonplace than the initial appraisal. Its completion has involved the items shown on this slide; although we already had representatives of the oil, gas, coal and nuclear industries at work on the project, we found it desirable to add two new groups dealing with electricity and water availability. All told, the study has involved some 65 experts drawn from outside the oil and gas industry and their participation has added greatly to the comprehensiveness and thoroughness of the work.

A central feature of this final report was the identification of the various economic and government policies which affect the energy picture. Changes in these policies was then postulated and through a series of parametric studies, the effects of the changes on our energy position were estimated. As a result of these possibilities for change, there emerged a range of possible outcomes for demand and supply projected through 1985 and these projections represent one of the specific requests of the Department of

the Interior at the time the study was undertaken.

For reasons discussed later, it did not suffice to make independent projections of supply for each fuel total up those projections and then compare the total with energy demand to obtain the overall energy outlook.

Instead, a more involved procedure was required to develop the overall energy balances and thereby determine the amounts of imported oil that would be required under various conditions.

The committee assessed the financial implications of its domestic supply projections and the balance of trade implications of its import projections. The committee identified those economic and government policy options which will influence the nation's longterm energy posture from 1985 to the end of the century. This involved analyzing broad trends affecting energy demand and supply and the technological advances that are likely to occur in the next 30 years.

This longer term outlook is highly important because of the long lead times and difficult problems involved in developing new energy sources such as solar energy and nuclear fusion.

Lastly, and at the Department of the Interior's specific request, we sought to identify those changes in government policy which might influence the nation's energy

posture.

Well, these analyses by the committee revealed that a very broad range of outcomes in the nation's energy posture is possible by 1985 and for general perspective, we will first summarize the principal elements of these findings and next we will deal in greater detail with the individual fuels.

The following conclusions can be drawn from the energy balances computed for 1985 as shown here on this slide and using an intermediate projection of demand.

First, under the most optimistic supply conditions, which is labeled "Case I" on the slide, domestic oil might provide 28 percent of total energy requirements in 1985 which would still represent a decline from 31 percent in 1970. If present trends continue as in Case IV, domestic oil will provide only 17 percent of total requirements in 1985.

Under the optimistic conditions in Case I, domestic gas could hold a 28 percent share in 1985 down from 33 percent in 1970. If present trends continue, Case IV, the share of energy requirements met by domestic gas would decline even more sharply than for oil, reaching a level of 13 percent in 1985.

Hydroelectric and geothermal power are expected to hold a fairly constant three to four percent of total energy to 1985. The share of total energy requirements met in 1985

by coal and nuclear is about the same for all four cases, 29 percent to 30 percent, up from 20 percent in 1970.

Imports of oil and gas in 1985 will of course fill the gap between domestic supply capability and total demand. Under Case I conditions, imports in 1985 would be 11 percent of total requirements, roughly equivalent to what they were on a percentage basis in 1970. If present trends continue, however, as reflected in Case IV, imports in 1985 would account for 38 percent of U.S. total energy requirements.

Now, these conclusions are based on supply-demand balances derived from these four supply cases and the middle demand projection. Possible future energy supplies were derived for the four cases considering our basic resource potentials and how the future economic climate, as determined by government policies would affect the rate of development of these resources.

The high end of the calculated supply range for each fuel, which is the basis for Case number I, would be difficult to attain. It would require a vigorous effort fostered by early resolution of controversies about environmental issues, ready availability of government land for energy resource development, adequate economic incentives, and a higher degree of success in locating currently undiscovered resources than has been the case in recent years.

The low end of the supply range availability which is the basis for these supply projections in Case IV represents a likely outcome if disputes over environmental issues continue to constrain the growth and output of all fuels, if government policies prove to be inhibiting and if oil and gas exploratory success does not improve over recent results.

The two intermediate appraisals, cases II and III, were also developed. Case II, postulates greater improvements in the finding rates for oil and gas and quicker solution to problems in fabricating and installing nuclear power plants than did Case III.

Well, from this broad overview of the results of the study, we would like to turn now to some of the important details and for this purpose I will next call on Mr. Warren Davis, the chairman of the Coordinating Subcommittee. Warren.

MR. DAVIS: Thank you, John. I wonder if I might be pardoned for an aside. I never thought I would get a sunburn at an NPC meeting.

I'd like to talk briefly about the demand projections and in a little more detail about the supply projections and, finally, in a little more detail about the energy balances.

As Mr. McLean mentioned, U.S. energy consumption in

the initial appraisal was projected at an average growth rate of 4.2 percent a year during the period 1970 to 1985.

The present study adopted the 4.2 percent growth rate as the intermediate case as shown on this slide. From this intermediate case, potential variations of future energy demand were made under different sets of technological, political and economic assumptions. Four factors were deemed to be the most significant long-range determinants of energy demand: (a) the economic activity as measured by the gross national product, (b) cost of energy including cost-induced efficiency improvements, (c) population and (d) environmental controls.

From the background studies made, these four factors in combination seemed to explain most of the changes in the energy demand in the past. The sensitivities of energy demand relative to these factors were estimated for each market sector and in this manner a series of energy demand cases were developed for different sets of assumptions. Since the number of possible variations is extremely large, two projections were selected that would bracket most of the likely energy demand cases. We have called them the high case and the low case.

This slide indicates actual demand from 1955 through 1970 and the three projections are shown for the period 1971 through 1985.

In 1985, energy demand is expected to fall within a range of about 112.5 to 130.0 quadrillion BTU's, up from 68 quadrillion BTU's in 1970.

The growth rate for 1955 to 1970 was -- averaged -- 3.6. This compares with growth rate of 4.4, 4.2 and 3.4 for the three curves that you see here. The generally higher growth rates projected in the coming 15-year period reflect the expectation that efficiency improvements in this period are unlikely to match the dramatic gains of the 1955 to 1970 period, especially for the electric utility sector. Any restrictions on energy demand growth could prove expensive and undesirable. Among other things, they would alter life styles, adversely affect employment, economic growth and consumer choice.

Electricity is expected to continue to be one of the most rapidly growing components of energy demand. As shown by the next slide, consumption of primary energy by the electric utility industry is expected to grow from 17 quadrillion BTU's in 1970 to 44 quadrillion BTU's in 1985. This results in an annual growth rate of 6.7 percent for this 15-year period. The average annual growth rate for the 15-year period past, 1955 to 1970, was a little under 6.5 percent. Electricity's share of total energy is forecast to increase from 25 percent in 1970 to 36 percent in 1985.

Now, at this point I would like to turn to the

supply cases. The methodology used in developing the supply cases for the individual fuels was done in this way. Relying on the basic studies prepared by the government and industry, the resource base potential of individual fuels was determined. For this study, when we say "resources," we refer to the amount of fuel in the ground including that that has not yet been discovered. When we say "reserves," we are referring to those resources that have been delineated and are capable of being developed for production and when we use the term "supplies," we are talking about quantities that could be produced, say, per day or per year.

The next step is to assume probable ranges of activity. For example, in oil and gas, drilling and finding rates that could be forthcoming in order to increase energy supplies. For each level of activity, exploration costs, operating costs and investment requirements were calculated.

Next, the unit revenues or the term price is used here required to cover costs and provide a range of returns on investment were computed.

In parametric studies made, the impact was determined by varying the factors affecting supply. These factors included discovery rates, operating costs and environmental programs, and government policies on leasing and taxation, among other things.

This presentation will focus on national data from

the study's findings. However, in the case of oil, gas and coal, supply analyses were conducted on a regional basis and the totals added up and you are looking at totals.

The application of this methodology for estimating future supplies of energy fuels is illustrated in the next several slides. Let's look at oil and gas first.

The resource potential for oil and gas was based on two studies, the NPC report, "Future Petroleum Provinces of the United States" and the Potential Gas Committee report entitled "Potential Supply of Natural Gas in the United States." As indicated by this slide, almost 50 percent of the ultimately discoverable oil in place and two-thirds of the ultimately discoverable gas still remain to be found.

These estimates include the resource potential of the North Slope. In dealing with most of the other factors affecting supply, the North Slope has been handled separately.

Many variables influence the supplies of domestic oil and gas that can be developed and the prices that will be required to make the development and production economically feasible. Two of the most significant of these are the drilling rates and the finding rates.

The drilling rate, which includes both exploratory and development drilling, is a major factor in determining projected supply. Over the last 10 to 15 years, drilling footage has declined at a rate of about 4 to 5 percent per

year, For the purpose of this study, drilling rates were assumed over a range that varied from continuation of the current 4 to 5 percent per year decline up to a growth rate of nearly 6 percent per year, a rate previously attained in the decade following World War II. The slide you are looking at covers these projections for oil and this one shows the same projections for gas.

The finding rate is the volume of oil and gas found per unit of drilling effort. This factor, which embraces an element of risk as well as exploratory skill, not only helps determine the projected supply but also heavily influences the future required prices. For this reason, both high and low finding rates were used to project oil and gas supplies. The low rate is an extrapolation of past trends and the high rate is generally about 50 percent higher.

This slide shows these factors for oil and the following slide shows the same factors for gas.

Additions to reserves are the results of both the finding rates and the drilling rates. The next slide shows oil reserve additions since 1955 and the projected reserve additions through 1985. During the past 15 years, total crude oil reserve additions for the United States, excluding the North Slope of Alaska, have averaged 2.7 billion barrels per year. The volumes added to proved reserves as a result

of new oil discoveries alone have decreased from 2 billion barrels in 1955 to about a billion barrels in 1970, a decline of more than 50 percent. Total reserve additions have been maintained through greater application of improved recovery techniques to previously discovered reserves.

The lowest supply case investigated, that is, Case Number IV, maintains total reserve additions at about 2.5 billion barrels per year for the next 15 years, largely as a result of continued application of increased recovery methods.

The highest investigated supply case, that is, Case I, adds reserves at an increasing rate with the period looked at here averaging about 3.8 billion barrels annually.

These volumes exclude North Slope Alaska reserve additions totalling nearly 10 billion barrels in the past and future North Slope additions ranging on the order of 300 and 600 million barrels per year in the future.

Historical and projected gas reserve additions are shown on this slide. These are annual additions of both nonassociated and associated dissolved gas. They have averaged a little less than 18 trillion cubic feet per year in the lower 48 states during the 1956 to 1970 period.

Gas discoveries in the past three years have been well below the average and were about 11 trillion cubic feet in 1970. In case IV, the losest case, total annual gas

reserve additions are projected to decline further to an average of a little under 8 trillion cubic feet in the next 15 years. In case I, the highest case, total annual reserve additions average nearly 23 trillion cubic feet per year.

These data, both historical and projected, exclude Alaska. About 31 trillion cubic feet of gas has been discovered in Alaska, of which 26 trillion was associated dissolved gas found on the North Slope.

These projected volumes likewise exclude projected Alaskan reserve additions through 1985, which are estimated to range from about 1.3 to 4.2 trillion cubic feet per year.

As a result of these reserve additions, total petroleum liquids production rates in 1985 are projected to range from 10.4 million barrels a day to 15.5 million barrels a day, compared with 11.3 million barrels a day in 1970 as shown on the slide.

The North Slope will supply approximately 20 percent of this U.S. total or from 2 million to 2.6 million barrels per day. Other pre-1971 discoveries will account for about 6 million barrels a day. The remainder, ranging from about 2.5 million barrels a day up to nearly 7 million barrels a day, will come from discoveries made in the 1971 to 1985 period.

The wide range in possible production resulting from future exploration emphasizes the need to encourage

development of our conventional petroleum resources.

Wellhead gas production in the United States increased at an unprecedented rate in the decade of the 60's from 13 trillion cubic feet in 1960 to a little over 22 trillion cubic feet in 1970. A large backlog of proved reserves made this rapid increase in production possible. This reserve backlog has now been used up and any future increases in gas production will depend on future reserve additions.

MR. MC LEAN: The slide behind, Warren.

MR. DAVIS: Pardon me. In the highest supply case, Case I, gas production was projected to increase from 22 trillion cubic feet in 1970 to about a little over 30 trillion cubic feet in 1985, including about 4.5 trillion cubic feet from Alaska. In the lowest supply case, that is, Case IV, gas production was projected to decrease to 15 trillion cubic feet in 1985, with Alaska providing a little over 1.5 trillion cubic feet.

Production from pre-1971 discoveries in the lower 48 is projected to fall to about 7 trillion cubic feet in 1985. Production from post-1971 discoveries is projected to range from a little over 6 trillion cubic feet in the lowest case, that is, Case IV, to a little over 19 trillion cubic feet in Case I, again underscoring the very real benefits to be gained by encouraging development of U.S. resources.

The average unit revenues or prices at the wellhead required to support the assumed range of activity levels were computed for each of these cases. A few observations about these calculations may be helpful. As used in this study, the term "price" does not mean a specific selling price as between the producer and purchaser and does not represent a future market value. The term "price" indicates the economic costs which would, on the basis of the cases analyzed, support given levels of activity for the particular fuel. To the fuel economists present, I would remark it is "cost" in the economist's sense.

These price calculations are based on covering costs and providing a specified return on net fixed assets. A variety of rates of return were used. Most of the discussion was centered on the 15 percent rate which is the middle of the range examined and also the rate that is in line with historical results, at least as they apply to oil.

These prices are in constant dollars based on the purchasing power of the U.S. dollar in 1970. Constant dollars are used since the degree of inflation or deflation in future years is not a subject on which one of the task forces had a high degree of expertise, thus we didn't attempt to forecast the rate of inflation.

Since the prices cited for the individual fuels do not consider the differences in quality, distribution

costs or use characteristics, the prices calculated in this study for different fuels cannot be meaningfully compared with each other. Average prices are a composite for fuels from existing facilities and from new sources.

As indicated by this slide, the required average oil prices in 1985 range from a little over $5 to something over $6.50 per barrel up from $3.18 actual price in 1970.

Required average gas prices range from about 39 cents to 53 cents per thousand cubic feet, up from a little over 17 cents in 1970. Average gas prices are composed of the prices for old and new gas.

Average gas prices are composed of the prices for old and new gas. If the prices for gas discovered prior to 1971 are held at current levels, then the required price for the new gas supply discovered would be in excess of 75 cents per thousand.

To measure the effect of various assumptions, some parametric studies were made dealing with factors such as finding rates, acceleration of additional recovery projects, offshore leasing, depletion rates and capitalizing intangible drilling costs. Variations in these major assumptions have a substantial impact on volumes and required prices. For example, in the intermediate case, a high rather than a low finding rate -- this is comparing Case II with Case III, actually -- would increase 1985 production by 2 million

barrels a day and about 5 trillion cubic feet of gas per year and would decrease the required prices by 42 cents a barrel and 13 cents a thousand. The results of some of these other parametric studies will be reflected later in some of the discussion that will follow.

Let's turn now to coal. Coal is abundant. The U.S. Geological Survey estimates the nation's coal resources at over 3 trillion tons. Of this total, about 150 billion tons of recoverable coal are presently known in formations of thickness and depth comparable to those being mined under the present technology. Minimum projected production in the next 15 years would use less than 10 percent of the 150 billion tons. This modest utilization of total coal reserves includes the output of coal for making synthetic fuels.

The potential production of coal in 1985 is projected to range from something over 1,500 million tons in Case I to a little over a billion tons in Case IV. All of this coal may not be used because of demand limitations and a little more on this subject later, too.

Case I reflects a 5 percent sustained rate of growth in conventional uses, compared with 3.2 percent annual increase in the 1960 decade. Based on industry history, the same type reserves as presently being worked will be ample to sustain a 5 percent growth rate. Cases II

and III reflect a 3.5 percent growth rate in conventional uses while Case IV is based on a 3 percent yearly growth rate in conventional markets.

The projections of 1985 coal requirements for synthetics vary between 339 million tons for Case I and 47 million tons in Case IV.

Coal availability and use through 1985 will be affected by the following factors:

Air quality standards and the development of effective means to control the emission of sulfur dioxide into the atmosphere when coal is burned will determine the extent to which coal can be used for electric utilities and industrial purposes. Stack gas control devices are one way to cope with the problem. Combined cycle plants might be another.

Surface mining regulations may restrict growth in coal production and may inhibit development of synthetics from coal.

Expanded coal transportation facilities are required to handle increased coal production. Manpower availability will also be a crucial factor.

Government leasing policies will affect the availability of coal from western coal lands. Production from this source is required for synthetic fuel production particularly.

Synthetic fuels production requires further technological improvements, particularly for making synthetic liquids.

Water availability will be sufficient to support moderate levels of synthetic fuel production in the west but additional water supplies would be needed to permit aggressive development.

Coal prices have been rising in recent years and additional increases are expected through 1985. In terms of 1970 constant dollars and based on a 15 percent return on investment, 1985 prices from underground mines are projected to be about $9.60 a ton. This would be about a 30 percent increase from 1970. The projected increases in prices of coal from underground mines is more modest than recent increases because productivity is expected to resume its historical upward trend. Productivity declines in recent years were due primarily to the Federal Coal Mine Health and Safety Act of 1969.

Surface-mined coal prices will be rising through 1985 and I emphasize that we are talking about required prices to achieve a given rate of return, not market values necessarily.

Because of the increased reclamation costs and increasing overburden, by 1985 surface-mined coal is expected to cost about $6.80 per ton as compared with about

$5.30 per day. The slide shows it as '70, however that is a figure for today. The '70 figure would be slightly lower. This would represent almost a 30 percent increase in price, too.

Now, turning to the subject of nuclear. Nuclear power growth establishes the basic demand for nuclear fuels. In the NPC's Initial Appraisal, installed nuclear generating capacity was projected to increase from 7,000 megawatts in 1970 to 300,000 megawatts in 1985. Depending largely on the degree to which nuclear power plant siting and licensing procedures will be improved so that plants can be built and operated on a timely basis, the installed nuclear capacity could range from as little as 240,000 megawatts to as high as 450,000 megawatts by 1985. As with coal, all of the nuclear capacity may not be needed because of demand limitations.

Case III corresponds closely with current forecasts of future nuclear power generating capacity by both the Atomic Energy Commission and the Federal Power Commission as well as the projections in the Initial Appraisal.

Case IV allows for a continuation and worsening of delays in nuclear power plant installation caused by licensing requirements and procedures and by objections raised in the courts under environmental protection laws.

Conversely, Case II assumes that standardization of licensing procedure and provision for realistic standards of

environmental protection criteria will enable timely approval of construction and operating licenses.

Case I projects a very high level of nuclear power capacity that is attainable but only with an immediate concerted effort by both government and industry to make utilization of the full potential of nuclear energy into a high priority national goal.

After 1985, it was assumed that the breeder reactor, a new type of nuclear power reactor that substantially reduces uranium requirements, will provide an increasing share of nuclear power generation. The sharp growth in demand for uranium raw material expected during the late 1970's and early 1980's will level off after 1985 as breeder reactors become operable.

Domestic uranium resources minable without significant cost increases are adequate to support the production of uranium needed to meet cumulative requirements through 1985. The Atomic Energy Commission currently estimates that there are 700,000 tons of uranium resources minable at a cost up to $8 a pound of U_3O_8 and something over 1.5 tons at a cost up to $15 a pound. The dollar costs estimated by the AEC do not necessarily represent the market price because these costs do not include all exploration costs or return on investment. While these costs would not necessarily stimulate exploration and development of these

resources, they are useful to provide a basis for judgment as to the existence of proved andpotential reserves and known deposits in uranium districts.

In addition, the prospects for locating other ore bodies in unexplored areas are very good. Proved reserves can supply the demand through 1980 although new mining and milling facilities will be needed to produce some of these deposits. Proved and potential domestic uranium resources minable at reasonable cost can supply requirements through 1985. However, to assure supply after 1980, exploration efforts must be increased in the near future to convert potential ore bodies into actual reserves.

Assurance that government policy will continue to ban importation of foreign uranium is also essential if necessary investments are going to be made.

Now, at this point, let me turn to oil shale.

Oil shale deposits are located in several areas of the United States, but only one region, the Green River Formation in Colorado, Utah and Wyoming is considered to be definitely commercially attractive. Oil shale deposits in this formation are estimated to contain 1.8 trillion barrels of crude shale oil. Of this amount, 129 billion barrels are in zones that contain over 30 gallons of oil per ton of shale and in seams exceeding 30 feet in thickness.

Within these richer zones, the attention in this

study was focused on some tracts containing about 54 billion barrels which are considered to be the most economically recoverable. However, less than 6 billion barrels of this prime 54 billion barrels of recoverable reserves are needed to support the maximum production between now and 1985 which is determined by construction time and environmental leasing constraints.

Under favorable conditions but short of an all-out national effort, projected 1985 syncrude production capacity, that is, Case I, is estimated to be around 750,000 barrels a day. Lower projections, Cases II to IV, reflect slower rates of investment because of either the lack of investment incentives or the need for time to demonstrate process feasibility.

Case I production levels are based on the projected construction and operation of one 50,000 barrel a day and seven 100,000 barrel a day plants by 1985. This case assumes that the first plant would be placed in operation by 1977.

Future government policies will play a very significant role in both the timing and magnitude of oil shale development. Federal leasing policies will influence the level of production because about 80 percent of the oil shale resources of the Green River Formation are located on federal lands. To attain the production projections of

Case I, federal policies would have to be changed to make adequate reserves available to support economic sized operation.

Although water availability may limit production over the long term, sufficient water is available for the highest anticipated rate through 1985.

For a 15 percent rate of return and in constant prices, prices of syncrude from deposits containing 30 gallon per ton oil shale range from $5.50 to something a little less than $6 a barrel. From 35 gallon per ton oil shale deposits, the prices are on the general order of $5 to $5.50 a barrel.

The study also considered the contribution to the nation's energy requirements that other energy resources and energy conversion devices can make. These include hydroelectric, tar sands, geothermal energy, combined cycle plants for electrical power generation and other energy conversion devices.

New energy sources are expected to supply only a modest amount of energy to 1985, but they will become increasingly important after 1985. Hydroelectric energy will continue to make a relatively minor contribution over the next 15 years. Growth in hydroelectric power is projected at only 1.6 percent per year in the period to 1985, primarily because there are few suitable dam construction sites remaining.

Hydroelectric power will therefore decline in importance as a component of total U.S. energy production from about 4 percent in 1970 to about 3 percent by 1985.

Tar sands deposits in the United States are quite small. However, the potential resources of the Athabasca tar sands in Northern Alberta are estimated to contain about 400 billion barrels of bitumen and could yield 174 billion barrels of snythetic crude oil. In addition, large deposits of heavy oil are located in Western Canada.

One commercial tar sands plant is presently in operation and others are in various stages of planning. Continued development of Canadian tar sands and heavy oil deposits could make a contribution of 1.25 million barrels a day to the Western Hemisphere's supply of crude oil by 1985.

Where hot portions of the earth's crust are in close enough proximity to underground water sources, the resultant steam can be utilized to drive conventional steam turbine generators. Even if geothermal energy sources, that is, steam wells and hot water wells, are developed at a very optimistic rate, we expect that they will supply only about 1 percent of U.S. energy requirements by 1985.

To affect significantly the national average efficiency of electrical power generation in 1985, new innovations would have to be technologically proved already. This is because existing electric generating plants have a

life span of several decades and new plants have long construction lead times. Only one such technological innovation, that is, the combined cycle plant, is currently available. The combined cycle plant utilizes waste heat from large gas turbines to generate steam for conventional steam turbines. The advantage of this type of plant is that it generates more electricity from the same amount of fuel than does a gas turbine power generating unit. The combined cycle is expected to make a modest contribution to holding down fuel requirements for electric utilities through 1985.

The committee considered a wide variety of other energy forms, none of which are likely to make a significant contribution to U.S. energy supplies by 1985.

Now I would like to briefly talk about the energy balances, mainly to give you a little more time perspective than you have had so far.

At the beginning of this presentation, the range of conditions that might characterize the U.S. energy situation in 1985 was summarized. Now, with the fuller examination completed of potentially available supplies and demand requirements, it is possible to see more clearly the time required to effect improvement in the nation's energy position and the size and complexity of the problems.

Without remedial actions, the deficit in domestic energy supplies will become greater over time. However,

a longer time period will provide the opportunity to take corrective measures to reduce the potential deficit. Because of long lead times required to increase domestic production, energy imports must increase over the next few years.

Possibilities for improvement in the energy situation over longer time periods are illustrated by a comparison of the various cases for 1975, 1980 and 1985 -- and all through this I am going to use the intermediate demand projection.

In the short term, through 1975, the options are limited for altering the trend toward greater dependence on foreign energy sources. In all four cases, imports will rise above the 1970 level of 12 percent. The percent of domestic requirements that are expected to be met by imports will vary from 20 percent in Case I up to 26 percent in Case IV. Despite the stepped-up activity of the high supply case, there will be relatively little difference between the import requirements under the high and low supply cases. This is caused by the long lead times needed to alter trends in domestic supply availability.

Going now to 1980, options for improving the domestic availability of energy supplies are greater in 1980 than they are in 1975. The percent of domestic requirements projected be met by imports now ranges from 16 percent for Case I up to 38 percent for Case IV. The spread among the

cases is wider than it was in 1975.

Now, let's go to 1985. In 1985, there is a large spread among the cases as far as imports as a percent of domestic requirements. Imports -- and these are imports of both oil and gas -- would range from 11 percent in Case I up to 38 percent in Case IV.

Now, to look more specifically at oil. The volume of oil imports , which is the balancing figure in computing an energy balance, is of particular significance. Oil imports in 1970 totaled 3.4 million barrels a day. As shown here on this slide, oil imports in 1975 varied from a little over 7 million barrels a day in Case I up to nearly 10 million barrels a day in Case IV. By 1980, the level of oil imports varies from a little under 6 million to a little over 16 million. By 1985 the spread becomes quite wide. Case I projects imported volumes at around 3.5 million barrels a day, not very far from where they are today. Case IV, on the other hand, shows an import level of over 19 million barrels a day in 1985.

In preparing the supply-demand balances, the committee was faced with some complex issues involving the limited substitutability among fuels and the difficulties associated with assessing interfuel competition by an industry group comprised of competitors. If all fuels were completely interchangeable, energy balances could have been

struck by adding up all the domestic fuel supplies and comparing the totals with the energy demands. The difference between domestic supply and projected consumption would be either available to be exported or required to be imported but all fuels are not completely interchangeable in all uses.

An automobile can be converted to run on natural gas. A residential coal furnace can be changed to burn oil or gas but neither an automobile, a gas furnace or an oil furnace could burn coal without extensive modification.

In projecting an energy balance of the various fuels, certain plausible simplifying assumptions were necessary. While oil is not completely interchangeable with other fuels in existing equipment, it could supply all the growth in any sector. Also, it is uniquely required for the transportation sector.

Gas is almost completely interchangeable. Hydro power and geothermal are used only in electric power generation but supplies of these two/sources are relatively small.
energy

Coal is utilized in significant quantities only in the industrial and electrical sectors and nuclear is confined to electricity generation. A complete analysis of each fuel used in each sector would be ideal, but such an analysis cannot properly be made by an industry advisory committee composed of competitors. As an alternative, the analyses of the Electricity Task Group were used for the

Electric Utility Sector which pretty well determines the marginal volumes of coal and nuclear needed and the remaining sectors could then be treated pretty much as a group, taking into account the simplifying conditions of wide interchangeability of oil and gas. Thus the energy balances in this study approximate those that would have been made had this very detailed analysis been possible.

Now, this covers the findings of the study and I would like to turn the floor back to Mr. McLean for some discussion about implications and so on.

MR. MC LEAN: Gentlemen, these trends in energy supply and demand which you have seen have the following implications: first, new facilities to handle imports.

Logistical arrangements must be devised to accommodate increased oil and gas imports. The use of very large crude carriers of 250,000 to 400,000 deadweight tons is desirable for two reasons; transportation costs are lower and the possibilities of oil spills are reduced.

At the present time, however, there are no U.S. ports capable of handling ships of that size. Without such port facilities by 1985, imports of an estimated 13.5 million barrels a day, the Case III level, would require the unloading of about 40 50,000-ton tankers somewhere along the nation's coastline each day.

Deepwater terminals must be built on the Gulf Coast,

the East Coast and the Pacific Coast if the benefits of the larger carriers are to be secured. Oil imports to the Gulf Coast and the East Coast will necessarily increase and as they do, large diameter pipelines and increases in water-borne commerce into the interior of the country will be needed.

Similar considerations are involved in the importation of natural gas, LPG, LNG and syngas feedstocks. New gas pipelines from the Canadian Arctic will be needed. LNG imports will also require substantial capital investment, both foreign and domestic for such facilites as liquefaction plants, LNG tankers and regasification facilities and storage.

Second, capital requirements.

Total capital requirements for the period 1971 to 1985 for development processing and primary distribution of all fules are projected to range from 215 to 311 billion. Of these amounts, 88 to 172 billion will be needed for oil and gas exploration and production. An additional 235 billion will be required for power plant construction and transmission facilities and these will bring the total capital requirements to a range of 451 to 547 billion.

Third, fuel prices.

The analyses indicate that real energy prices of domestic fuels at the wellhead and the mine must rise

significantly by 1985 since the prices cited for the fuels do not consider differences in quality, in distribution costs or use characteristics, the prices calculated cannot be compared meaningfully with one another. The projected range of percentage increases in average prices required to 1985 -- in terms of 1970 dollars -- over 1970 for each of the individual fuels is indicated on the chart.

Fourth, dependence on foreign supplies.

Besides the possible large increases in volumes of imports, a shift in the source of imports through 1985 is indicated. A larger share of the U.S. imports will come from the eastern hemisphere. Thus, as imports rise, the country will become increasingly dependent on the political and economic policies of the small number of distant foreign countries.

This, in turn, can have important consequences with respect to the military, political and economic position of the United States. Consideration should be given to the need for additional storage to cushion the impact of possible near-term interruptions in foreign supplies and to the desirability of utility plants being constructed to burn more than one type of fuel.

Worldwide supplies will tighten between 1971 and 1985 as the ready availability of low cost oil declines. The noncommunist reserve-to-production ratio will drop from

about 27 in 1972 to between 14 and 19 in 1985.

Other countries of the world, especially the developing countries, will need increasing quantities of fuels to support their industrialization programs and thus will be increasingly important purchasers in the world fuel markets.

Toward the end of the century, foreign oil supplies may prove insufficient to meet all potential demands.

Greater oil and gas imports will have a major impact on the nation's balance of payments. The cost of imported fuels, less the sales revenue from fuel exports, results in a sizeable net dollar drain. This dollar drain was$2.1 billion in 1970. It will range from $9 billion to $13 billion in 1975 and from $7 billion to $32 billion annually by 1985.

These projections indicate a three-fold to fifteen-fold increase in foreign exchange requirements by 1985 over current levels.

To pay for our imports of fuel, we will need to seek additional exports of other goods and services. The magnitude of the potential problems in this area are highlighted by the fact that today our total annual exports of all goods and services are only about 65 billion.

Now, for the projections to the Year 2000.

In addition to the analyses of energy demand and

supply through 1985, the committee looked beyond to the end of the century. Now, these projections involved considerable conjecture but, nevertheless, they revealed some probable developments and suggested some lines of action which should be initiated. The most important conclusion to be drawn is that the nation's indigenous fuel resources could probably satisfy the nation's demand for energy in the years 2000 and beyond if they were called upon to do so.

The nation's total energy requirements in the period 1985 to 2000 will continue to grow rapidly but at a somewhat slower rate than in the 1970-1985 period. The slackening in energy demand growth will occur as the population growth slows, the economy becomes more service-oriented and changes in social values and lifestyles emerge such as smaller families and multiple dwellings.

Total demand in the Year 2000 could range from 170 to 215 quadrillion BTU's which compares with 68 quadrillion BTU's in 1970. The principal feature of energy growth over this period will be a spectacular expansion in electricity use.

By the Year 2000, electricity production will account for nearly half of the primary fuels consumed as compared to 25 percent today. Depending on demand, government policy and technological developments in the interim, a number of possible supply situation could prevail

in the Year 2000. Using the study's 1985 intermediate supply level as a starting point, for example, supplies of conventional fuels could range from 131 to 211 quadrillion BTU's in 2000.

Approaches available to ensure that the U.S. will have adequate domestic energy supplies in the latter part of the century include the fact that we should initiate action in the following areas:

First, the need to locate more reserves applies to all fuels but especially to oil and gas, the fuels that are in shortest supply. Discovery and development of offshore petroleum reserves could do much to restore a strong domestic petroleum base. By the Year 2000, production of synthetic fuels could contribute 20 or more quadrillion BTU's or 10 to 20 percent of our total energy needs if certain problems are resolved.

Second, greater production efficiency could be achieved in a number of areas; increased recovery rates in developing oil, gas and coal reserves, improved conversion of fuels to electricity -- the rate of efficiency is now only about 33 percent -- the development of high-voltage transmission lines to reduce electricity transmission losses, greater efficiencies in energy utilization could reduce growth in energy demand. Examples of possible approaches include development of more efficient automotive engines, greater

emphasis on mass transit systems and improved building design and insulation to lessen heating and cooling losses.

Third, the U.S. has vast resources of coal and uranium which can be brought into wider use in the last 25 years of the century. Both coal and nuclear fuel are oriented primarily to the electricity market so fuller use of these fuels implies greater use of electricity in mass transit and industrial uses such as process heating.

Fourth, the most promising new sources of energy includle geothermal power, solar energy, nuclear fusion, energy from refuse, hydrogen, methyl alcohol, fuel cells and thermionics. A large-scale contribution from any of these possibilities by the end of the century is unlikely. Modest contributions will be possible if research efforts into the relevant technologies are accelerated in the near future.

Typically, the expansion of domestic energy supplies is characterized by long lead times. Thus, the most important requirement is to guarantee a sound future energy position will be a firm public commitment to long-term domestic energy development. The nation should decide on the domestic fuels most amenable to expansion and the several technological areas susceptible to productive research and development. Then with sound national policies established in a favorable economic climate, the country's resources

could then be marshalled to develop the energy supplies needed over this longer term.

In the period between now and 1985, the nation has three basic options to balance energy supply and demand. The country could rely on increased imports to meet energy requirements. The committee concluded that this alternative would not well serve the nation's security needs nor its economic health because of uncertainties regarding both availability and price.

To obtain the necessary imports, the United States will be competing with sharply expanding requirements in Western Europe and Japan. Greater reliance on imports would also result in major balance of trade problems that could affect the value of the dollar.

A second option would be to seek reductions in energy demand growth. Consideration was given to imposed restrictions on demand and increased efficiency in the utilization of energy. The imposed restrictions on energy demand growth could prove expensive and undesirable. Among other things, they would alter life styles, adversely affect employment, economic growth and freedom of consumer choice.

Such restrictions would arouse political resistance and be difficult to implement in any substantial way between now and 1985 because of enormous problems involved in changing the nation's social and economic framework.

More efficient use of energy is clearly desirable and some improvement is possible and likely as energy becomes more costly and as technology advances. There are, however, inherent limitations on the amount of the improvements that can be accomplished in the next 15 years. Better home insulation, for example, will conserve energy but many years will elapse before the construction of new or rebuilding of old homes can effect a material reduction in the nation's total requirements.

The committee concluded that significant departures from the 4.2 percent intermediate demand growth used in this study were unlikely. A range of 3.4 to 4.4 percent annual growth was judged to embrace the likely possibilities. The lower growth rate would reduce the 1985 demand by 10 percent from the intermediate projection and 15 percent from the high projection.

The committee concluded that the third alternative, increasing the availability of domestic energy supplies is the best option for balancing energy demand and availability.

Actions taken soon could increase domestic supplies in the longer term, thus reducing dependence on imports very markedly by 1980. Fortunately, no major source of U.S. fuel supplies is limited by the availability of resources to sustain higher production.

Now, this approach requires increased incentives to

promote the development of domestic supplies, many of which may cost substantially more than in the past and hence the price of energy would necessarily rise to cover the higher costs and yield a sufficient return on investments.

Accelerated development of domestic energy supplies would benefit all segments of society. Employment would increase. Individual incomces would rise. Profit opportunities would improve. Government revenues would grow and the nation would be more secure.

In requestiong the NPC to undertake this study of the nation's energy outlook, the Department of the Interior requested that emphasis on those areas where federal policies and programs could effectively and appropriately contribute to the attainment of an optimum long-term energy posture.

To meet the goals of the best overall policy option, increasing the availability of domestic supplies, the committee has set forth 10 specific policy recommendations and where possible, the study has analyzed the impact of these policy recommendations on the nation's energy position.

First, prompt action should be taken to develop a comprehensive national energy policy and a coordinated, consistent program to accomplish our national energy goals.

The Federal Government should not seek to play a larger role in the discovery and development of natural resources. This task should be left to private enterprise.

The chief role of the government should be to establish priorities and guidelines and to eliminate the delay, conflicts and confusion that presently prevail among the many different federal, state and municipal agencies involved in energy matters.

Second, realistic graduated approaches to environmental goals are essential if our energy demands are to be met and the environment improved at reasonable cost. Protection of the environment requires the application of more energy to achieve cleaner air and water. Prompt action is needed to eliminate the serious delays that have been caused thus far by environmental issues. The following require immediate government attention:

Minimize delays in oil and gas exploration and development, laying of pipelines and construction of deepwater terminals and new refineries.

Establish effective siting and licensing procedures for nuclear power plant construction and operation which will eliminate undue delays.

Accelerate development of commercially viable desulfurization technology and other means of utilizing high sulfur fuels.

Establish guidelines for land restoration to ensure minimum environmental impact in surface mining operations. The impact of environmental considerations on the nation's

energy position can be very significant. For example, delays in authorization of the Alaskan pipeline system will deprive the nation of at least 2 million barrels per day of crude oil and 3 trillion cubic feet per year of natural gas. Nuclear reactor plant siting and licensing delays could cost the electric utility industry an additional $5 to $6 billion for each year's delay in the early 1970's in nuclear plant schedules. Banning of surface mining could reduce 1985 coal supply potential by almost half and could prevent the development of western coal production for making synthetic liquids and gas.

Health and safety standards for mining should be based on reliable evidence that such regulations would, in fact, protect human health and safety. This is particularly important in such areas as radiation control, sound abatement and dust control. Unnecessarily restrictive regulations can curtail production of much needed energy resources.

Third, the government should accelerate the leasing of lands for exploration and development of energy resources by private enterprise.

More acreage should be provided at more frequent intervals. This study and others conducted by both government and industry indicate that a very large portion of all energy resources are located on federal lands. Access to these areas is essential if the nation is to increase the

availability of indigenous fuel supplies.

For oil and gas, the largest potential for developing new domestic reserves in the period to 1985 is located in offshore and frontier areas of the United States. If the nation is to achieve the Case II oil and gas production estimates, lease sales totaling 21 million acres on the outer continental shelf will be required over the next 15 years. This is three times the 7 million acres that have been made available over the last 17 years.

If no new leases were offered in the offshore areas, it would cost the country about 2 million barrels per day of domestic crude oil and nearly 6 trillion cubic feet per year of gas in 1985.

Federal leasing policies will also have a considerable impact on other energy fuels, coal, uranium, oil shale and geothermal.

Fourth, The maximum development of synthetic fuels production postulated in Case I requires an immediate government program to provide necessary dams and aqueducts in the western United States as well as timely resolution of the jurisdictional disputes over water rights.

Fifth, fiscal policies should be designed to encourage the finding and development of all energy supplies. Recent developments have had a contrary effect. The 1969 Tax Reform Act alone placed an additional tax burden on the

domestic petroleum industry of some $500 million per annum. Fiscal policies should encourage the creation of capital requisite for increasing energy supplies and reducing costs to the consumer.

The long-established tax provisions for the extractive industries such as those dealing with percentage depletion and current deduction of intangible costs have historically promoted the development of energy supplies. The weakening or the elimination of such tax provisions would inevitably increase energy costs to the consumer.

For instance, complete removal of the statutory depletion allowance would necessitate an immediate price increase on the order of 50 cents per barrel for oil and 3 cents per MCF for gas. In later years, as costs rise, these required price increases could become as great as $1 per barrel and 7 cents per MCF for gas in 1985. Until more effective tax provisions can be devised, existing measures should be retained.

The continuation of oil import quotas is essential for three reasons:

A secure domestic energy base is a vital element of national security.

Elimination of oil import quotas would have an adverse effect on the U.S. economy by aggravating the balance of payments problem, reducing government revenues arising from

domestic oil operations and reducing employment in oil and oil-related activity.

Finally, oil import quotas are needed to encourage development of all indigenous energy supplies.

To encourage the growth of the domestic uranium mining industry, existing policies for imports, enrichment operations and government stockpile disposals should be continued. Present import policy requires that uranium enriched in U.S. Government facilities for use in domestic reactors must be of U.S. origin until the Atomic Energy Commission determines that a viable domestic uranium mining industry has been established.

Restrictions on imports of uranium are necessary to aid the industry in making the transition from supplying primarily a government market to supplying a mature commercial market.

Seventh, most energy balance cases did not utilize all of our potential coal and uranium supplies. Coal and nuclear were projected to supply only about 30 percent of the U.S. energy requirements in 1985, while the potential supplies of these two fuels would be sufficient to meet up to 45 percent of the 1985 energy requirements.

Now, this is because these supplies were not needed to fuel the projected electric utility generating capacity. Accordingly, policies that would help overcome barriers to

more rapid development of electric generating plants and encourage wider use of electrically powered equipment would permit the nation to use more of its coal and uranium resources. This would reduce projected energy imports thereby mitigating the adverse effect of such imports on national security and the balance of trade.

Eighth, despite the superior characteristics of natural gas, domestic prices of this fuel are held by the Federal Power Commission to a fraction of the price of substitute fuels. This results in a paradoxical situation in view of present and prospective major supply shortages. At the same time that the government engages in this supply-limiting action, serious consideration is given by government and industry to the importation of natural gas at substantially higher prices, thus illustrating the contradictions in current regulatory policies.

Ninth, the Federal Government should establish an economic and political climate which is condusive to energy development by private enterprise. An earlier section indicated the necessity and benefits of restraining imports of energy; within the broad limits set by government import controls private competitive enterprise will continue to be the best and lowest cost method of meeting energy needs.

Tenth and last, the study indicates that additional research is required in such fields as exploration methods

and equipment, the production of synthetic fuels, more efficient production and use of energy, coal mining technology, greater recovery of oil and gas reserves, development of new energy forms and development of the breeder reactor.

The extent to which such research is undertaken will, however, depend on the establishment by the government of an economic and regulatory climate that will permit attractive returns to fuel suppliers conducting such research.

We believe that from this study it can be concluded that supplies of secure, clean fuels will become increasingly tight over the next three to five years. This condition will become more severe in the longer term if present trends and policies continue. The most obvious and necessary corrective action is to encourage the development of domestic supplies of all forms of energy. An adequate resource base is available for this purpose.

Such an approach will enhance national security, ensure freedom of consumer choice, help mitigate the growing trade deficit caused by importing more of the nation's energy requirements, and promote economic growth.

The potential for improving the U.S. energy situation in the 1980's can only be realized, however, if the economic climate is favorable and sound national policies are adopted and implemented very soon.

We hope, Mr. Chairman, that the foregoing policy

recommendations will make a useful contribution to the difficult decision-making process that lies ahead. On behalf of the Main Committee, I am now ready to offer this summary report for approval.

But before I sit down this morning, I would simply like to take a moment to express very great appreciation to Warren Davis and his Coordinating Subcommittee, all of the task groups, the NPC staff and many others who contributed to this report's comprehensive coverage and to the thoroughness and clarity of its findings.

I think we owe them all a vote of thanks.

Warren, you have done a great job.

(Applause.)

MR. TRUE: Thank you, John. I am sure that I can speak for the entire Council in thanking not only those you mentioned but you personally and your Main Committee for this monumental work that you have accomplished.

Do I hear a motion that the report be adopted? And I call your attention to the fact that there is a transmittal letter in the front of the report.

SPEAKER: I move that we accept the report.

SPEAKER: I second the motion.

MR. TRUE: It has been moved and seconded that the report and the transmittal letter as submitted be adopted by the Council. It has been seconded and we will now call

for discussion.

DR. GONZALEZ: Mr. Chairman, I would like to discuss the report.

MR. TRUE: Dr. Gonzalez.

DR. GONZALEZ: Let me say first that I appreciate the immense amount of work that has gone into this report and that I wish that we could approve it unanimously. I have been pleased to hear the presentation this morning and to find that some of the points that concerned me have been made in the presentation.

However, there are some others that I think should be made and I would like to take a few minutes of your time to talk about those.

The complex and detailed report submitted by the Committee on U.S. Energy Outlook deserves more than perfunctory action by this Council, because the analyses and conclusions proved by the Council would be used widely in ways that affect energy policies and the economic progress, social advances and security of this nation.

While it is impractical for all members to review and pass on the host of assumptions and details involved in preparation of the report, we all have a responsibility to judge whether the analyses and conclusions are consistent with our knowledge about oil and gas and their relation to other forms of energy and to dissent from portions of the report

that we may find less than satisfactory in promoting the understanding necessary to progress in solution of energy problems.

I have been told that I cannot understand the report. I can only say that I have studied the work of the committee since it was organized and studied the report very carefully. If I have trouble understanding the report, perhaps others less familiar with energy economics may also have trouble in interpreting what the report means.

The report can be improved. I will use three examples to illustrate this point:

First, at the bottom of page 75 of the report before you, the second fundamental -- it is not at the bottom, but it is listed as the second fundamental objective of energy policies, is said to be to "preserve the environment in the production and use of energy."

This statement is ambiguous and confusing. I do not know what we mean by "preserve the environment in the use of energy."

I think we mean that public policies should establish reasonable environmental standards concerning the production and use of energy. If that is the intention, then the language definitely needs to be clarified along these lines.

Second, on page 76 in discussion on imports, the

second column on the right, the statement is made that "the national cost of the import quota system is considerably less than that of other alternatives such as maintenance of stand-by production and storage capacity."

From my own studies, I believe that this conclusion is correct, but I do not find the necessary supporting evidence in the report. I wonder how the Council can make that statement unless the deficiency is corrected by evidence.

Third, page 12 of the report presents calculations of the price increases required to offset complete removal of percentage depletion, whereas yesterday the committee agreed that the computer programs should not be used for that purpose.

There are several major conclusions in the report and in the presentation this morning which I believe should be stressed. The first of these was stated very clearly by John McLean, chairman of the committee, in a speech on September 21, 1972 and stated again this morning. His words on September 21 were as follows, "We should take all possible action to stimulate and accelerate the development of our indigenous energy resources."

I believe that recommendation should be stressed because such action provides the best and lowest cost long-term solution for the energy needs of this nation.

The second point is that development of oil and gas deserves special emphasis because these fuels supply most of the energy that the nation will need during the remainder of this century and because they are the most suitable fuels from an environmental standpoint. This, too, was mentioned this morning.

The third point is that the potential exists to permit very significant expansion of U.S. oil and gas production provided that access to potential resources is not impeded by governmental restraints and provided that economic conditions encourage much larger outlays for exploration, for development, and for improved recovery from known reserves and from future discoveries.

The fourth point is that both imported fuels and synthetic substitutes for U.S. crude oil and natural gas in the relations developed by domestic operations are so much more costly that the interests of consumers in the nation can be served best by finding out the entent to which supplies of crude oil and natural gas can be increased by improved economic policies and incentives before vast sumes of capital are irrevocably committed to very expensive foreign and domestic substitutes.

Finally, we should stress that inherent uncertainties as to technological progress and as to the number and size of new discoveries make it impossible to predict

with any degree of accuracy the response of supply to changes in price.

Recent testimony before the Senate Interior Committee indicated that better exploration methods might enable the location of stratographic tracts within the time span of this report which, if it occurs, could have a very major impact on discoveries, costs and supplies.

As for new discoveries, we cannot say now whether the Atlantic Seaboard and the Alaska offshore and the Alaska interior will be similar to the North Sea, to the Gulf Coast Continental Shelf or be of negligible importance.

These major conclusions should be emphasized in the letter of transmittal for this report.

I also believe it is necessary to warn against misinterpretation and misuse of the computer programs that are the basis of much of the report because these programs are not consistent with the realities of oil and gas exploration and development. The program assumes that exploratory footage is drilled separately for oil and separately for gas and you have seen that presentation this morning whereas the truth is that the industry searches for and develops oil and gas jointly.

It is unfortunate that the programs do not take advantage of the capability of computers to use a correct model, even though it would be more complex. The use of

The use of incorrect models only invites further troubles for this nation resulting from confusion about the ability to secure more gas in the quantities wanted and needed merely by changing gas prices without changes in oil prices.

A change only in new gas prices would have a small and slow effect on incentives to increase exploration and development whereas a significant change in oil prices would have a large and immediate impact on the exploration for and discovery of oil and gas.

The report also refers to numbers that are called, "prices" but the footnote -- footnote explains that these numbers are not really selling prices in the appropriate sense of this word in the dictionary and in common use, but the revenues calculated to be required to yield assumed rates of return.

Such presentation confuses a complex subject and may lead to misinterpretation. Separate rates of return have been used for oil and gas investments incorrectly, even though the report recognizes that these operations are inseparable and that the correct rate applies to composite investments in oil and gas.

Furthermore, the assumed rates of return are not and cannot be related to past experience because there are no data on rates of return for oil and gas separately.

Available data on rates of return for joint oil

and gas operations are inadequate in two respects.

First of all, we don't have good data for the small operators who are responsible for much of the exploration and drilling and discovery.

Second, rates of return are not measured in terms of dollars of constant purchasing power as used in the programs. The information available on rates of return deals with current dollars in relation to dollars invested over many prior years during which the purchasing power of the dollar was much higher, with the result that a 15 or 20 percent book rate of return as commonly used means much lower rates in constant dollars.

Ability to attract funds into this business in competition with others depends on relative rates of return and the differentials in rates relative to risks rather than to the absolute rates alone but no mention is made of this important fact.

Computer programs, to be released later, will inevitably be used to make all sorts of calculations by changing variables and running the equations through computers. To the extent that the models are incorrect, the use of computers merely multiplies errors and leaves people with the delusion that the answers are right because they are the result of mathematical calculations that few can understand and evaluate.

We must guard against harmful mistakes of this nature by the use of common sense and by appropriate warnings in the preface to the report.

Two examples will illustrate dangers that will probably result from the use of models in the report.

First, the models will be assumed to provide a means of calculating price increases required to offset reductions in percentage depletion. These answers will be wrong because the models overlook the psychological value that investors place on reductions in income tax payments.

Second, the various cases presented may be used to draw conclusions of questionable value about the responses as applied to price unless the report highlights warnings about their inadequacies for that purpose.

The incorrect view that environmentally desirable supplies of oil and gas are "in the words of a high official of the government recently -- limited at almost any price" is already too prevalent in Washington and should be dispelled rather than encouraged.

The remarkable expansion in supplies of oil and gas in response to better real prices in 1946 - 1957 was far greater than this industry expected or would have predicted in the forecasts presented at the end of World War II.

As an exercise in humility, I used to keep in the

top drawer of my desk a forecast for the period 1946 to 1960 which was the common forecast and assumed that the United States was practically at its peak of production at the end of World War II and could not hope to increase its production by more than about 10 percent. Now, we all know that that prediction proved dreadfully wrong because it failed to take into account the impact of price on the incentive to explore for, discover, and develop resources.

The experience with declining real prices since 1958 means that no recent data exists usable and useful in determining what the current and future response might be to improved economic incentives. Unless and until such data are available it would be a mistake and a tragedy to write off the potential capacity for expansion by U.S. oil and gas producers without any effort to find out what actually happens in response to a significant change in trend and incentives.

I have tried to influence the outcome of the work of this committee by various suggestions.

I believe that the only alternative now is for the Council to make its approval subject to key points set forth in an initial statement by the chairman of the Council, preceding the report of the committee.

At its meeting yesterday, the committee considered a proposed letter of transmittal to be placed at the

beginning of the report and agreed upon four points, including a warning against misuse and misinterpretation of the computer programs that have been used by the task groups and are scheduled to be released later.

The draft of the transmittal letter distributed this morning deletes the caution against misuse and misinterpretation. I consider these words of caution approved by the committee yesterday, essential and urge this council to see that the words of caution already approved by the committee be stressed in the first point listed in the transmittal letter dealing with the computer programs.

The caution can be in the exact form approved by the committee yesterday or, if the council prefers, it can be included in the first point by the following wording:

One, It is necessary to warn against possible misuse and misinterpretation of the computer programs to be released later which deal separately with oil and gas strictly to facilitate calculations. In fact, the joint nature of oil and gas exploration and production means that these fuels should be considered together rather than separately. Furthermore, the computer programs cannot be used to calculate the elasticity of supply, the impact of changes in tax provisions on ability attract capital and on the amount of price changes required to increase oil and gas reserves and availability and deliverability.

Gentlemen, I regret that it is necessary for me to speak on this subject, but I think it is a subject of vital importance, not only to this industry but to the nation. I think that the warnings that we should put in the letter of transmittal are the ones that the committee approved yesterday or the equivalent.

Thank you.

(Applause.)

MR. TRUE: Thank you, Dr. Gonzalez.

Mr. McLean, would you like to respond?

MR. MC LEAN: Well, Mr. Chairman, I would simply remark on behalf of the committee that over the past three years we have had many discussions with Dr. Gonzalez. We have heard his viewpoints on many occasions and examined them in considerable depth.

On many issues we have batted in his direction as far as we could. I only regret this morning that we have not been able to accommodate him 100 percent and I suspect it is indeed difficult in an effort of this kind involving as big a group as it has for any one individual to be accommodated 100 percent.

Now there is an answer to each of the points which Dr. Gonzalez has mentioned. These have been considered by the Main Committee and the Coordinating Subcommittee and the conclusion is that we have adjusted the report about as far

in his direction as we could and my suggestion, Mr. Chairman, I don't think it is possible to debate each of these rather technical issues here this morning, much less to undertake in this committee as a whole, the redrafting of particular sentences.

Mr. Chairman, I would suggest that the Council simply take note of Dr. Gonzalez' dissent and proceed with consideration of the report.

MR. TRUE: Thank you, John.

Are there any further comments?

MR. HEALY: Mr. Chairman, I should like to say that I intend to vote for this report with pleasure, but in doing so, may I call attention to provisions on pages 12 and 75.

MR. TRUE: Excuse me, would you identify yourself for the Council, please?

MR. HEALY: Yes, my name is Northcutt ~~Healy~~ NCH.

On pages 12 and 76 which relate to the import program I call particular attention to the language on page 12 at the end of discussion of the caption "Maintain Oil Import Quotas," the statement of the Council is "that, although concurring with the general purpose of oil import quotas, the National Petroleum Council does not feel its responsibilities in this report extend to a detailed analysis of specific regulatory or allocation features of the present

mandatory oil import program" and on page 76 the statement at the end of paragraph number three stating,"The import program should apply equitably to all parties and should be designed to interfere as little as possible with normal economic forces and competitive relationships."

I am impelled to make this comment because the report calls attention to the fact that by a date between 1985 and 2000, the electric industry will require half of the total energy of production taken into account in these equations. It is my personal feeling that the consumer interests, primarily the power industry because of the magnitude of its dependence on fuels, must have participation in the determination of import quotas and I note with pleasure that the Council, while supporting the general principle of import quotas, does not identify itself with the present technique for establishment of these quotas.

It is my personal opinion they are subject to vast improvement and I am happy to see that the Council reserves its position in that respect.

Thank you, sir.

MR. TRUE: Thank you.

DR. GONZALEZ: Mr. Chairman, let me make it quite clear that I am not trying to get the committee to change its report to accommodate me 100 percent. The point I have raised is that the committee voted on something yesterday, on specific

language. That language has been modified in the draft that was presented to the Council today and I would like to know whether the committee wants to change its vote of yesterday or whether the committee wants to put in the warning against misuse and misinterpretation.

MR. MC LEAN: Well, Mr. Chairman, I'll speak to that. At the conclusion of the Main Committee yesterday the task of editing and putting in shape for presentation was left to myself and Warren Davis, the chairman of the subcommittee and any changes in substance we have made are entirely inadvertent. The clause Dr. Gonzalez refers to was taken out because in the committee's final arrangement it had no relevance to items two, three and four, which stand on their own merits with no reference to computer models. I think I would like to make one other point and that is this:

The conduct of this study involved a great many mathematical computations. Some of those computations were made by hand. Some of them were made on simple adding machines. Some of them were made on office calculating machines. And some were made on computers simply because it could be done faster and I think perhaps too much attention is being attached to the so-called "computer models."

Really, all that we used computers for was to speed certain mathematical computations and if you wish to

deal with these mathematical computations, it seems to me we should deal with all of them, which are numerous and many.

MR. TRUE: Thank you, John.

MR. MC CLURE: Mr. Chairman.

MR. TRUE: Mr. McClure.

MR. MC CLURE: Harold McClure. Mr. McLean, I do not understand whether your answer to Dr. Gonzalez was yes or no. I think it deals far more deeply than with just the mathematical computations or than with the bent of one individual, Dr. Gonzalez. I think the very basic, philosophical statement that Dr. Gonzalez made is involved and I think the question should be answered to the issue of yesterday, yes or no and after some 35 years in the exploration for petroleum hydrocarbons, oil and gas and their variations thereof, I can only say there are many of us here in the room today, if the issue were before the floor, who would support a motion were it to encompass the statement of Dr. Gonzalez.

Thank you.

MR. TRUE: Thank you, Harold. Would you care to respond?

MR. MC LEAN: Well, we are down here to a question of language, gentlemen. The transmittal letter as it now stands -- if you will direct your attention to page 2, paragraph one. Let's read it together and be sure we know

what we are talking about. It says, "While the joint nature of oil and gas exploration and production suggests that these fuels should be considered together rather than separately, separate computer programs for oil and gas have been used in the report to provide flexibility in calculation.

"However, it is necessary to warn against the use of the computer programs to calculate the elasticity of supply, the impact of changes in tax provisions on the ability to attract capital, and the amount of the price changes requires to preserve -- to increase oil and gas reserves and deliverability."

I stress that middle sentence. "However, it is necessary to warn against the use of the computer programs."

Gentlemen, I submit we have taken care of Dr. Gonzalez' report in rather clear and forceful language and I think further editing of it would detract from rather than add to his point.

SPEAKER: Mr. Chairman, I move for the question.

MR. TRUE: Are you ready for the question?

All in favor?

(There was a chorus of ayes.)

Opposed?

(A very few speakers respond "No.")

MR. TRUE: The report is adopted.

Is there any other business to come before the

Council?

(No response.)

If there is no other business, I would like to again thank our speakers and Mr. McLean and his committee, and would like to announce that there is a formal press conference to be held down the hall, this way, in the Senate Room right now.

The 67th meeting of the National Petroleum Council will stand adjourned.

Thank you, gentlemen.

(Whereupon, at 12:30 noon, the meeting was adjourned.)