

OIL IMPORTS AND ENERGY SECURITY

HEARINGS

BEFORE THE

AD HOC COMMITTEE ON THE DOMESTIC AND
INTERNATIONAL MONETARY EFFECT OF ENERGY
AND OTHER NATURAL RESOURCE PRICING

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OIL IMPORTS AND ENERGY SECURITY

FRIDAY, AUGUST 9, 1974

HOUSE OF REPRESENTATIVES, AD HOC COMMITTEE ON THE
DOMESTIC AND INTERNATIONAL MONETARY EFFECT OF
ENERGY AND OTHER NATURAL RESOURCE PRICING OF THE
COMMITTEE ON BANKING AND CURRENCY,

Washington, D.C.

The committee met, pursuant to notice, at 10:15 a.m., in room 2222, Rayburn House Office Building, Hon. Thomas Rees [chairman] presiding.

Present: Representatives Rees, Hanley, Stanton, Frenzel, and Roncallo.

Also present: Dr. Douglas R. Bohi, Dr. Milton Russell, and Nancy McCarthy Snyder, consulting economists.

Mr. REES. I will call this meeting to order. The purpose of this meeting is to have a staff presentation of part II of the ad hoc committee's study on the pricing of energy and other natural resources. Part I of the study, which was given to the members of the committee several weeks ago, dealt with how we got to where we are in our energy situation. Part II of the study is an approach to what might happen in the future, and the formal title is "Oil Imports and Energy Security: Future Prospects."

Much of this study relates to Project Independence projections of what we can produce in this country by 1985, what the cost will be, what the various options of the OPEC countries might be. The economists who have been writing part I and part II are from Southern Illinois University, Carbondale: Dr. Douglas R. Bohi, Dr. Milton Russell, and Nancy McCarthy Snyder. I will now turn the meeting over to them to give us an outline of part II.

STATEMENTS OF DR. MILTON RUSSELL, DR. DOUGLAS R. BOHI, AND NANCY MCCARTHY SNYDER, CONSULTING ECONOMISTS, SOUTH- ERN ILLINOIS UNIVERSITY, CARBONDALE

Ms. SNYDER. Part I of the study was devoted to analysis of the current energy situation. By putting the energy shortage in economic perspective, we hope to provide a basis for predicting future supply and demand levels, and to establish criteria on which energy security policy should be based. The course that the United States will ultimately follow with respect to energy will have a significant impact on the entire international system.

We conclude in part I that the crisis of 1973-74 was a problem of adjusting to higher energy prices without advanced warning. It was not a problem of exhausting the world resource base. The shift in the

international petroleum market from a cartel of international oil companies to a cartel of oil-producing countries has had a market effect on the security of U.S. energy supplies.

Domestic energy output has been affected by the degree of competition in the domestic energy industry. A number of factors contributed simultaneously to the energy shortage of 1973-74. In addition to import quotas, price controls and State prorationing policies, the regulation of natural gas prices increased demand and reduced supply. Productive capacity in the coal industry had been declining over a long period and the development of nuclear electric generating capacity was delayed. Environmental constraints increased the demand for energy at the same time that they reduced the use of some forms of energy. Combined with these factors was the fact that the rate of growth of energy demand, accelerated by worldwide economic boom, increased faster than expected.

In general, the energy crunch was the result of a series of policies that prevented smooth operation of market forces and stimulating domestic output and restricting domestic demand in an orderly way. As a result of the shortages and the growing power of the OPEC cartel, imported petroleum prices rose drastically between 1971 and 1974, from less than \$3 per barrel to more than \$12 per barrel.

The conclusion of this review of the situation is that our basic problem for the future will be one of uncertainty, not only with respect to the supply of energy, but with respect to the price at which that supply will be available to us. Part II of our study deals with the problems and issues involved in achieving and maintaining secure energy supplies in the coming years. As our dependence on imports grows, our vulnerability to another embargo increases.

Such an event would require large supply and demand adjustments in this country. Chapter 6 focuses on these adjustments. We conclude that the energy consumers will have to bear the major burden of any shortage for a period of approximately 2 years or more. It will take at least that long for the domestic energy industry to increase supply significantly, assuming the maximum cooperation from all sectors of the economy.

The costs of adjustment are high, and it will be difficult to mobilize the resources necessary to meet the requirements of the domestic industry in an emergency. We must therefore take some action to protect ourselves against the uncertainties of energy supply and price that confront us. The options available to us are many.

We can protect ourselves from shortrun interruptions. Acceptance of a plan of this nature would hinge upon the threat of embargo, which in turn depends on the international situation. We must therefore pay careful attention to OPEC behavior.

Another option for us is to isolate ourselves completely from the international situation by becoming self-sufficient. Alternatively we could devise domestic policies that maintain longrun energy security in an open economy.

Any policy decision must be based on some expectation of future magnitudes of energy supply, demand, and price. Discussion of the security risks implied by dependence on foreign energy, analysis of the policy options to reduce these risks, and estimations of future U.S. energy supply-demand balance are the next subjects.

Dr. BOH. The next chapter in part II, chapter 7, is concerned with an estimate of lower bound price of imported oil. We have already talked about this in part 1 and was shifted from part 1 that was concerned with history, to part II, which is hypothesis, giving a cleaner break between the two.

Let me briefly cover some of the things we talked about in this chapter. The point of reference here is to suppose the cartel collapses, perhaps due to the weight of excess capacity, and world prices fell:

How far would they fall?

What is the lower limit?

In this chapter we estimate that the lower limit is \$3 per barrel, landed U.S. east coast. You may ask why is that important. Well, it gives a view of the lower bound extreme that domestic industry may be faced with in the future, and may show why they are somewhat reluctant to make investments in very highly capital intensive areas, with the high average cost of production, which simply could not compete with these prices. Certainly, the lower extreme must be taken into consideration for any future policy decisions about Project Independence and self-sufficiency. It is not a forecast of what will happen, but simply an extreme of what may happen. Incidentally, it need not actually happen to have its discouraging effect upon investment. Just the prospect that it could happen is sufficient.

The estimate is based upon production costs in the Persian Gulf and delivery costs to the United States, because we believe that that area will be the price-determining area for world prices.

The most uncertain element about the price is, of course, the amount of royalty that will be required to induce host countries to part with their oil rather than leave it in the ground. Our minimum here is a dollar a barrel, largely based on past experience.

Chapter 8 is concerned with estimates of future oil imports. We developed in this chapter a range of estimates of import demand based on a range of supply and demand projections in the United States. They range from a set of optimistic supply and demand conditions to relatively pessimistic supply and demand conditions. If you take these extreme conditions as equally likely, the best point estimate of the outcome for 1985 is simply the midpoint. Our estimate is 7.6 million barrels a day, which amounts to 35 percent of future consumption, or not much different than it is right now. If you take the approach that energy policy must be geared to the pessimistic outcome, which we believe it should, then you have to take into consideration the upper extreme. In our subsequent discussion of policy alternatives we start with the midpoint estimate, then go up to the upper extreme of 15 million barrels a day, or about 55 percent of U.S. oil consumption.

These estimates are based largely on the National Petroleum Council's projections that were published in 1972, but they have been modified by some current events, namely the increases in crude oil prices. We assume also in these projections that natural gas prices will be deregulated.

Essentially the forecast assumes that the current price of crude oil of around \$8 a barrel will persist indefinitely. Given that price assumption, what is the likely availability of all energy, especially crude oil and the demand for energy. The supply and demand estimates, ranging from the pessimistic to the optimistic, are balanced assuming

that all energy supplies that could be available will be used, except perhaps coal and nuclear power. The projections assume that up to 74 percent of electrical generation will be satisfied by coal and nuclear power.

But even assuming that, there will still be an excess availability of potential coal and nuclear power. So not all potential supplies will be used. The gap that results between the supply and demand estimates implies that we must import the gap or that domestic prices must rise.

The rest of this chapter supposes that imports do in fact satisfy the shortfall in domestic energy supply. The range of estimates already given, the 7.6 to 14.8 million barrels—are broken down by likely sources of imports.

The midpoint estimate, as I pointed out before, is about the same as current experience. So we simply expect that the same pattern of imports would exist in 1985, too. The increase over today's experience we would expect to come from the Persian Gulf countries and Nigeria. In short, the estimated volume of Arab imports in that midpoint estimate comes to nearly 2 million barrels a day, which is a bit more than current estimates, and that amounts to slightly over 8 percent of U.S. consumption in 1985.

As for the upper estimate, the difference between this midpoint estimate and the 15 million barrels a day upper estimate is largely expected to come from Arab sources. Consequently, in the upper case Arab imports rise to 7.9 million barrels a day, or nearly 30 percent of U.S. consumption. That pretty much covers the highlights in this chapter.

Chapter 9, then, goes on to discuss the nature of the security risks implied by these projections, specifically, the necessary increases in domestic prices that would be required to reduce import demand. The main risk, of course, is the price and quantity uncertainty that is implied by these imports. We discount the balance-of-payments risk to the United States, because if the Arab world and the rest of the petroleum exporting countries are induced at all to supply the world oil requirements, the excess foreign exchange earnings that they are likely to accrue are undoubtedly going to flow to the United States in large part, so that the United States may be expected to be a net recipient of petrodollars.

Nevertheless, in order for the oil exporting countries to have these incentives requires that the United States actively engage in promoting investment opportunities in the United States and also facilitate the necessary institutional requirements for recycling international capital. The balance-of-payments risk is a rather manageable risk relative to the quantity risk and the price risk.

The quantity risk could be handled by increased storage or increased shut-in capacity that could be used in an emergency. This is the subject of chapter 10. That alternative does not guard very well against price and quantity uncertainty. So we consider the options of direct import controls, subsidies, consumption taxes, and various other policies. The direct controls are largely the subject of chapter 12; the subsidies and taxes are the subject of chapter 13.

The rest of chapter 9 considers an estimated price import relationship. The idea here is, given the assumed price of \$8 a barrel, and the range of import projections that I talked about, and assuming

that there is some elasticity of supply—that is, that as price rises, domestic producers are inclined to reduce the rate of output—and there is also some price elasticity of demand—that means that as the price goes up consumption is discouraged—then a relationship between the price and the amount of imports we will require in 1985 results.

Given a number of assumptions about these elasticities, we estimate that complete self-sufficiency in the United States could be achieved at prices ranging between \$10 a barrel and \$13 a barrel, depending upon whether you take the optimistic or pessimistic demand and supply conditions. These imply, of course, that self-sufficiency could be achieved in the United States if the domestic price rises approximately to current world price, and if everybody expects it to remain there indefinitely. Whether or not it will is a big question. We have already talked about the lower bound price. In chapter 11 Mr. Russell will be talking about what we might expect to happen with respect to the cartel, and therefore what the range of cartel prices might be.

If we assume that world prices are not expected to remain as they are—and we do not expect them to remain there—how could we achieve self-sufficiency—that is, how could you achieve these prices?

You could by import controls, of course, either impose a tariff, which raises the domestic price, or a quota which creates a scarcity that forces the price up. In fact, the estimates that I just gave, the price estimates, would be precisely those that would be required by a tariff or a quota that would eliminate all imports.

Another alternative to achieve complete self-sufficiency would be to give a subsidy to domestic producers, leaving the \$8 a barrel price unchanged for consumers. The idea then would be to leave the domestic price alone, but encourage sufficient additional domestic production to satisfy all wants. The price may have to rise to as high as \$18 a barrel in order to induce that much more output, and that implies a subsidy of nearly \$10 a barrel.

On the other hand, you could leave the incentive to domestic production at about \$8 a barrel and discourage consumption by imposing a consumption tax. That tax may require a price—including the tax—of up to \$171 a barrel, or a per barrel tax of up to \$9.

Given those preliminary estimates of what may be required, chapter 10 talks about the option of meeting the security risks of these import projections with increased emergency storage or shut-in capacity.

Ms. SNYDER. As our dependence on imports grows, the threat of an embargo grows. But the many political and social differences among the OPEC nations make it highly unlikely that the organization as a whole could find a common target or a common cause for undertaking an embargo. The possibility that a subgroup of OPEC would be willing to interrupt supplies to the United States is much more likely.

The only subgroup of OPEC that will probably be able to do this is the Arabs. Only they have a sufficient share of the world market, lack of necessity to export to the United States, and the likely political incentive to undertake an embargo. Even though the threat is real, the likelihood of enforcing an embargo effectively is very small. The development of excess capacity throughout the world and the commercial maintenance of increased inventories will reduce the impact

of any future embargo. On the other hand, our growing dependence on Arab energy and the expanding role of Arab producers in shipping and refining will increase the risk of a supply interruption.

Protection against the risks of an embargo could be accomplished by maintaining some standby supplies of oil. One way to maintain these standby supplies would be by storage. The annual cost of storing a barrel of oil in an above-ground steel tank would be between \$2.04 and \$2.29 a barrel, depending upon the price at which the oil is purchased.

Mr. REES. That is per year?

Ms. SNYDER. Yes.

An alternative means of maintaining energy supplies would be to shut in productive capacity. The cost of maintaining excess capacity is the amount required to induce the producer to hold his oil in the ground rather than to produce it. That is, the interest that would be earned on the value of the oil held in the ground. The annual cost of shutting in 1.8 million barrels per day capacity—that is, the midpoint estimate we made in chapter 8 for Arab imports—at a \$10 price and a 12-percent interest rate would be \$788 million. A policy of protection by means of standby capacity has the advantage of not being restricted to a particular time period.

Even if that amount of shut-in capacity is maintained, it will take a certain amount of leadtime to bring it up to the productive state. Therefore, an optimal policy of protection against shortrun interruptions would be some combination of storage and shut-in capacity.

The main advantage of a policy that deals specifically with emergencies rather than to seek continuous self-sufficiency is that it allows us to take advantage of insecure energy imports at the same time that it allows us to conserve our domestic resource base. The disadvantage is that it provides little protection against violent price fluctuations and the uncertainties associated with them.

Dr. RUSSELL. I want to go on and talk, then, about what we might expect from the OPEC countries, and in effect what the price fluctuations might be and what expectation there might be in terms of short-run interruptions such as we have had before. Policies to deal with the uncertainties exist. The real question is, what are those uncertainties and how much do we need to pay in order to deal with uncertainties.

We want to examine the issue, then, of what the oil exporting countries are likely to do in the future. We want to report on some of the more interesting results of our study, not only because they are interesting in and of themselves, but because no one else has before suggested, I submit, this rationale of how the OPEC decisions might well be made in the future. That is what we want to come to now.

The oil exporting nations, I think we must agree, now control the world market. The important matter for the importing countries is how this newly won power will be used. We accept that political and historical factors play a great role in oil exporting country decisions. But the outside constraints on those decisions are created by economic forces and these are the ones that are our concern.

What we set out to do here is to predict a set of oil exporting country prices under longrun conditions, ignoring inflation. Now, OPEC has signaled its intent to operate as a cartel to increase revenues. But intent is a long way from reality.

As we all know, OPEC, if it is to succeed in holding up prices, must hold down output. Yet no efficient means of operating a cartel are available to OPEC because it is made up of sovereign nations. It has no enforcement power. But what the cartel can do is to establish a target price which in turn determines world demand and then allocate production quotas in such a way as to make all producers better off than they would be under competition, and consequently make them willing to go along. Then if some member countries decide they do not want to go along because they are not getting quite as large a share of the world market as they think they should, quotas can be renegotiated within the OPEC cartel.

To follow this strategy, though, the cartel must choose a price. It has to find that target price. But that is not an easy process nor an obvious one, because different countries, because of economic conditions, will want different prices, and no one can say what is the correct price; it is very difficult to bring agreement among sovereign nations when they do not, cannot, find some external reference as to what the correct price is.

It is our view that a price exists that OPEC will likely choose, and that is the price based on the self-sufficiency price in the United States—that \$10 price that Doug mentioned a moment ago. A self-sufficiency price has, to the negotiators of OPEC, an external reality. Each country knows what that price is or can estimate it using the NPC data or other data that has been established. Each country also knows that at a price above the U.S. self-sufficiency price it will not be able to sell into the U.S. market in the long run, and also knows that the United States will become an exporter of energy and energy technology if it tries to push the price above self-sufficiency price in the United States. They also recognize that there is no reason to charge a price lower than the self-sufficiency price in the United States because the lower price would simply lower their revenues.

Now, the question is, what is the price that the countries will receive if they do indeed choose this self-sufficiency U.S. price as their focal price, the price they are going to try to establish their cartel around?

Well, the f.o.b. price to the exporting countries on the basis of a \$10 c.i.f. price in the United States ranges from a high of \$10.28 in Algeria to a low of about \$7 in Kuwait. These are the prices we predict that these countries will receive if the cartel holds in the long run. On this view, the longrun cartel price is somewhat lower than current prices; that is, we predict that world oil prices should trend downward in the intermediate term, then perhaps rise a little, to settle at a level no higher than \$10 a barrel c.i.f. to the United States. The question then is, will that longrun price stay continuously at \$10?

As Doug has suggested earlier, if we knew it would stay continuously at \$10, we would not have any security problem, but we would have high prices, because at that price we would have self-sufficiency. Our view is that it will not stay at that \$10 price because of, again, the fact that these countries are sovereign nations. The cartel price can only be maintained if each country is satisfied with its share of total sales.

But from time to time some will not be. They will want to sell more to take advantage of a cartel price far above their cost, and as some

countries place a bit more oil on the market here and a bit more oil on the market there in order to get a little bit more than their quota, what will happen is that prices will decline, and then there will be short-term price conflicts among the OPEC countries.

It is our thesis that these prices do have a lower limit; that is, that there is a lower bound below which these prices will not fall. After a period of price softness, we find that some countries will decide that they would prefer to leave their oil in the ground rather than to sell it at a price that they consider too low. The issue, then, is what is the price at which these countries would choose to leave their oil in the ground?

We argue that it is the present value of the future revenue that could be received from a barrel of oil if it were produced later rather than immediately. In other words, the value of the oil in the ground will determine the lower bound below which these countries will not choose to sell additional oil.

This value will differ from country to country depending on the country's discount rate and depending on its f.o.b. price. According to our calculations, I think it is interesting to note that the reservation price for oil from different countries as it is imported into the United States ranges from a high of about \$7.90 for Qatar, about \$7.30 for Saudi Arabia, to a low of \$2.29 for Indonesia. These are the prices they would be willing to sell the oil for rather than leave it in the ground, or alternately, these are the prices below which they will not sell oil under any circumstances. Again, price is c.i.f. the United States.

Therefore, we would suggest that intracartel jockeying for greater sales, even though it will create price instability in the world, cannot drive the price below about \$7.50 imported into the United States so long as the member countries, and especially Saudi Arabia, expect the cartel to be revived and the prices ultimately to rise back up to their target price of \$10. The cartel price will fluctuate, we argue, as delivered in the United States, from about \$10 to \$7.50 a barrel, depending on supply and demand conditions.

Our analysis also identified the countries that in the long run will be the price cutters and the countries in the long run which will be those that will support the price of oil. The price cutters in the long run include Indonesia, Iran, and Nigeria.

The producers on the Arabian peninsula, on the other hand, will be the ones to resist price declines because their longrun interests are in higher prices, whereas the countries I mentioned earlier have more of the need for current funds. These results from our study, looking to the long run, are obviously different than the current statements of the different spokesmen for these countries. But I think we can explain the differences, and I will be happy to elaborate on that later if you like.

In the discussion thus far our analysis was based on the assumption that all of the exporting countries will expect the cartel to remain strong. There is a contrary view, of course, often expressed, that the cartel will not in fact survive, that it will decline in a spate of competitive price cutting.

We conclude from our analysis that the cartel will likely remain secure, that it is unlikely to fall, if the threat comes from economic

forces. Of course, they can make mistakes on economic forces and have misconceptions about each other's positions and jockeying can degenerate into a price war. But we think that highly unlikely.

On the other hand, the OPEC cartel can also fall because of internal conflicts, because of massive shifts in world supply and demand, because of intracartel difficulties between, for example, the Arabs and other nations. In these latter circumstances disruptions are not predictable, and consequently we cannot take a position on whether the cartel will decline for these essentially political reasons. But note that if the cartel falls for any of these reasons, the result could be a competitive price of as low as \$3 a barrel, \$3 c.i.f. the U.S. point of entry.

This is an unlikely, but a possible result. The uncertainty of price creates the problems for American producers. What we want to look at now is, how do we deal with this uncertainty for American producers and for American consumers in a most efficient way? That is the subject of the last two chapters of the study.

Dr. BOHL Chapter 12 returns to the subject of import controls and brings together some of these estimates that you have been hearing here. Recall that in chapter 8 we said that if the price remains indefinitely at about \$8 a barrel that imports are expected to be from a midpoint of nearly 8 million barrels a day to up to 15 million barrels a day. Chapter 9, on the other hand, suggests that the United States could achieve self-sufficiency in the long run after all of the necessary adjustments had taken place at a price between \$10 and \$13 a barrel.

In order to achieve that higher price, \$10 to \$13, depends upon conditions in the world oil market. That is to say, you do not have to do anything if the world oil price is that high. You could just let the domestic price rise up to that level. On the other hand, if the world price falls below that level, then the United States has to engage in some policy to protect domestic producers.

Incidentally, before I forget it, we do provide estimates of import levels at other prices and not just the extreme of self-sufficiency.

As I said before in the beginning and Dr. Russell has repeated, there is the possibility of \$3 a barrel if competition returns to the world oil market, and he just concluded that it is likely that a minimum price under cartel conditions would be \$7.50 a barrel. So the \$3 a barrel and the \$7.50 a barrel price provide us with two reference points, the possible world prices that must be guarded against under two extreme world market conditions, the condition of competition and of an effective cartel.

The difference between those two alternative world prices and what the U.S. price is what would have to be achieved by either a subsidy or an import control or some other form of tax. That difference between those two prices, the domestic price and the world price, is the basis for the protective effect to domestic industry and also the opportunity cost to American consumers.

If the import price were \$7.50, the lower bound cartel price, and the United States engaged in an import control policy to eliminate all imports, we estimate that U.S. consumers would have to pay approximately \$34 billion a year more for petroleum products than they would if imports were allowed uncontrolled. On the other hand, if the world price fell as low as \$3 a barrel, U.S. consumers would

be faced with paying up to \$66 billion more per year for petroleum products. These figures obviously reflect a very heavy burden for the U.S. consumers if we engage in a self-sufficiency policy.

These costs apply whether tariffs or quotas are used. The difference between tariffs and quotas concerns uncertainty about prices and quantity, administrative flexibility, and in other respects.

The quota achieved the price, as I said, by restricting quantity, in the extreme case to zero, and then forcing the domestic price to rise in order to clear the market. The tariff would raise the price directly and allow the market to squeeze out imports indirectly.

A major distinction between quotas and tariffs is the certainties and uncertainties that they generate. Quotas maintain absolute certainty with respect to the amount of imports, of course, but a great deal of uncertainty about the domestic price that must be achieved in order to clear the market.

Tariffs establish that price with relative certainty. But the amount of imports that will be allowed are relatively uncertain. Quotas tend to insulate the domestic market from changes in demand and supply conditions, while tariffs, on the other hand, tend to transmit those changes through prices.

Quotas are inherently discriminatory unless they are auctioned—but we have never auctioned them—with the licenses usually issued by some subjective, often political, criteria. Tariffs on the other hand operate through the market system, so that anybody who wants to import from any source may do so. Both controls may be designed to discriminate according to source. But we do not expect such an effort to be very successful for the same reason that we do not expect a selective embargo by exporting countries to be very successful either. Quotas are more flexible to administer because they do not require legislative approval, while tariffs do, and this greater flexibility is advantageous if changes in market conditions warrant changes in import restrictions.

However, there is much to be said for maintaining public debate, even at the expense of flexibility. The difference between the price of imports and the domestic price created by the control is the scarcity value of imports that accrues either to the Government in the form of tax revenues—if tariffs are used—but to importers or exporters if a quota is used. Given that we expect the OPEC cartel to continue, we would expect that that scarcity value of imports would accrue to the oil exporting countries, not to the oil importing companies.

In short, the inflexibilities imposed on the market by the quota system—and we talked a great deal about those inflexibilities in part I, in chapter 3 we believe that this is a compelling reason to prefer a tariff over a quota, if in fact any import controls are going to be used at all.

We would probably recommend with some reluctance a tariff on a standby basis to eliminate the downside risk to domestic industry. We would recommend something slightly below the lower bound if the cartel exists. That would be something around \$7 a barrel, that is, a tariff that would maintain the import price of foreign oil at approximately \$7 a barrel.

Now, the next chapter considers these other policy alternatives, the subsidies and the taxes.

Dr. RUSSELL. I want to talk about things that are a little bit more common, or perhaps have a little more direct appeal as far as the public

is concerned, as ways of dealing with our energy security problem. We have looked at some of these policies before, but let us look at them more directly now. The direct actions that Government could take might include such things as subsidies to increase outputs, a hodge-podge of particular policy changes—most of which would be desirable whether we have a problem of energy security or not—and, finally, much-neglected programs to reduce energy demand.

First let us talk about subsidies. Subsidies in general are against the public interest. They distort the decisions made by producers and consumers and, as fairly widely recognized, they lead to inefficiencies. They can be justified only if they increase efficiency or bring about a desired change in the distribution of income in some efficient way. While subsidies in general are not recommended, if a subsidy is to be granted, in our paper we suggest that it should be based on capacity and not on output.

Now, Government risk-absorption is a kind of subsidy, a special form of subsidy which might have much more desirable effects. Government can absorb risks by producing energy on its own or it can absorb risks of producers by guaranteeing prices for private production. Those are two kinds of subsidies which could be used. Unfortunately, very sound arguments against each of these alternatives exist and we certainly would not recommend either of them.

Government absorption of some of the technological risks, on the other hand, is highly desirable on many grounds and probably should be expanded. Government subsidies for research and development, with proper guarantees to insure free and easy access to information by all parties, can reduce the total resource cost of new energy supplies. Such Government support would promote competition by lowering entry barriers and by increasing the number of participants in the energy industries.

A switch in the allocation of R. & D. is also called for. More funds should go to intermediate-term projects. Government support should be continued through the prototype stages and not end with just basic research. Government support of, for example, demonstration plants full scale may well be wise as an absorption of risks. Expanded Government activity in developing data underlying petroleum exploration and in developing coal and oil shale conversion technologies are also analyzed in chapter 13.

Moving away from subsidies, several other policies could also be adopted to increase energy security. Among these are alterations in the way the public lands are opened for exploitation. With reference to Federal land leasing, especially OCS—the Outer Continental Shelf—diverse methods of bidding, especially through the use of royalty shares which puts Government into joint ventures with oil firms, could well produce major benefits. Competition would be enhanced and productive capacity increased. The deregulation of the field price of natural gas would increase the supply of energy and the supply of both gas and oil, and restrict gas consumption in inferior uses. The shift in the focus of environmental regulations away from fuels and toward emissions and their effect on ambient air quality would lead to more efficient use of energy.

Of particular interest to this committee, policies which improve the functioning of international markets and which facilitate foreign

investment in the United States would be especially helpful in including oil exporters to continue supplying the U.S. market.

Further investment in the U.S. energy supply can be made relatively more attractive by eliminating subsidies to export of energy equipment and by abolishing tax incentives to foreign energy production.

We turn now to the last policy that we analyzed, the controversial matter of restricting energy demand. It can be done. The question is, At what cost in terms of human welfare? One policy would be to improve consumer information regarding the relative efficiencies of different pieces of equipment. Another would be research on more efficient energy consumption. And few, I think, would disagree with either of these policies of Government.

Beyond here, though, lie instruments to reduce particular kinds of energy consumption and to reduce energy consumption in general. Now, a selective restriction of energy use means substituting Government edict for private decisionmaking, which probably leads to inefficiencies. Clearly though, whether the benefits are worth these costs is a political matter and not subject to economic analysis.

On the other hand, a general tax on petroleum and other insecure energy sources would be consistent with the general welfare, so long as the revenues covered no more than the real cost of energy consumption, including the cost of security and the cost of environmental damage. There is certainly a role to play here for restricting demand in the interest of energy security.

Well, to summarize, what we have done in parts I and II of this study is to set the stage for the work which is to follow, dealing specifically with the effects of these changes in our energy situation on the international financial community. If there is one conclusion we could draw, it is that with appropriate leadership and decisionmaking, the United States can come out of this situation secure, without being impoverished. For other nations of the world the picture is considerably more gloomy.

We are now ready to answer any questions or expand on any of these elements or make any informal remarks that you might choose to request.

Mr. REES. Thank you very much. I appreciate your presentation.

You are assuming that we can have complete selfsufficiency in this country if the energy price were high enough?

Dr. BOHL. That is right.

Mr. REES. But that probably the best policy would be to not have selfsufficiency, but have sufficient storage backup so that you could take advantage of lower prices of imports?

Dr. BOHL. Basically that is right. The question of selfsufficiency is, at what price? It is not a matter that we are running out of resources. We are running out of resources that are relatively cheap to produce.

Mr. STANTON. Just following that—and I appreciate all the economic factors that play in determining selfsufficiency—could you recommend to us what you would recommend as the level of selfsufficiency that we should establish?

Dr. RUSSELL. We could talk about that today if you like. We were scheduled to deal with the recommendations specifically on Monday.

Mr. STANTON. I will wait until Monday.

Dr. RUSSELL. We might point out on this selfsufficiency bit that it is always easy enough to get selfsufficiency. All you have to do is consume less. But that comes at, again, a very, very high price, as we suggested, something like \$17 a barrel.

Mr. REES. So you figure probably the cheapest form of storage is to have shut-in capacity like Elk Hills?

Dr. BOHL. That is what our estimates seem to say.

Mr. REES. Well, that might be a good idea. For example, they are talking about drilling the Outer Continental Shelf and now they are talking about drilling outside of Los Angeles, and there is a great deal of opposition. But it might be a policy that in areas where there might be an adverse environmental impact, you might drill the field, improve it and then cap it, and use that as a shut-in capacity for protection against boycotts.

Dr. BOHL. That is true. I understand that in some cases, such as the Santa Barbara Channel, it is the drilling that is the risk and not the production.

Dr. RUSSELL. The production itself is usually not environmentally hazardous. I say "usually". It is the accidents that can take place in the process of drilling in some areas which are environmentally hazardous. And so, I do not know that not producing would be that much less hazardous. But there certainly is a good argument for maintaining standby capacity.

Mr. FRENZEL. You hardly discussed the allocation of exports by the OPEC countries or by the OPEC cartel. I guess you discussed some of the political factors.

What happens when a new government, perhaps erratic or unstable, coming into control of one of the countries on which we are now quite reliant—for instance, Venezuela or Nigeria—those two run about neck and neck as our major suppliers—

Dr. BOHL. And Canada.

Mr. FRENZEL. What happens in that instance?

Dr. RUSSELL. Are you suggesting what happens if—

Mr. FRENZEL. There is either a unilateral embargo or an enormous price fluctuation.

Dr. RUSSELL. Well, this is essentially the problem. That always that possibility exists, and the question is, What is the price of the insurance we are willing to pay in order to avoid the uncertainties that might be created by the kind of change that you are suggesting?

Mr. FRENZEL. OK. What is the probability, then, of the other OPEC countries adjusting their production to fill that hole? This is unilateral action.

Dr. RUSSELL. We have some history behind us, though the world has changed so much since that time that I do not know if we can rely upon it. Certainly at the time of the Iranian convulsion in the early fifties when Iran nationalized their oil industry, the other countries and the oil companies had no hesitation in taking over Iran's markets.

Mr. FRENZEL. How about during the embargo? Did not Venezuela increase its production and did not the other African countries increase their production?

Dr. RUSSELL. Well, the African countries that were not Arab countries certainly did. But we were in a peculiarly bad position at the time of the last embargo because pretty well worldwide the industry

was operating close to capacity. It was not a question of whether Iran, for example, wanted to increase its output. It was a question of whether Iran was able to increase its output, and every indication was that they all increased their output as much as they could, but they simply could not do enough.

Mr. FRENZEL. OK. Is that the condition under which we are likely to labor for the intermediate term, that everybody is going to be nearly at capacity anyway and that they cannot pick up slack in the case of disruption of one of the major suppliers?

Dr. BOHL. No. I would think we expect some excess capacity to develop in the future, not only on the production side, but also in terms of inventories here and in other countries, and a corresponding increase in refinery capacity. It has been a serious problem for the United States. I think it is more of a refinery capacity problem than a crude oil problem. We would expect these kinds of adjustments to be made because of two changes: One is the fact that OPEC is something altogether new in the world today that we never had before, and that creates a great deal of uncertainty for the companies and they have got to make adjustments to guard against the risk. Also, the United States is importing a greater proportion of its oil consumption now than it ever had in the past. It was largely self-sufficient before 1970. So we can expect inventory adjustments on the basis too.

Dr. RUSSELL. I would just note right now that right now there is apparently about a 2- or 3-million-barrel-a-day surplus capacity. So if we have an interruption problem right now, it could be picked up.

Mr. STANTON. To verify your results, we had lunch with Secretary Simon yesterday, and several of the points you did make, especially on the surplus availability today—2 million barrels—your price range, from \$7 to \$10 dollars, would come down, coincided with his.

Dr. RUSSELL. Of course, we do not know whose estimates those are.

Mr. STANTON. He made another significant fact, that the American attitude, probably thinking of these Arab countries—some people think of them as Palestinian guerrillas. In reality these are the shrewdest, sharpest, most educated, capable businessmen that you probably run into anywhere in the world.

Dr. BOHL. Often educated in the United States.

Mr. REES. We educate them at Harvard Business School.

Dr. RUSSELL. This is one of the reasons that I would submit that our estimates of OPEC behavior are not likely to be too far wrong, because they are calculated on the basis of maximizing behavior on the part of those countries; how can they themselves be made better off.

Now, of course, we cannot include in that the political factors, the internal factors, the convulsions governmentally that we talked about before.

Mr. STANTON. He said another thing. In considering their ability to cut back, they reach a point whereby their own use of natural gas becomes a factor. Would you agree with that?

Dr. RUSSELL. What?

Mr. STANTON. That their use, their tremendous growth and their need for natural gas becomes a factor in how far they can cut back?

Dr. RUSSELL. That is certainly true of some of the countries. But most of them have surplus gas. I will give you one interesting example, though, and that is Kuwait. Kuwait operates its total utility structure on the basis of natural gas, which is produced concurrently with oil.

If Kuwait does not produce oil for 10 or 12 days, the lights go out in Kuwait because they cannot produce the gas without producing the oil. Consequently, there is a limit to how far down Kuwait, for example, can reduce production.

Mr. REES. On the two buzzes, it is the rule on the military construction bill. What I think we might do is vote. I will be back. I would like to ask some more questions. But I suspect that during the 15 minutes that we are not here that other members in the audience might wish to ask some questions. So we will just kind of throw it open informally.

[Whereupon, at 11:15 a.m., the committee was recessed, to reconvene at 10 a.m. on Monday, August 12, 1974.]

OIL IMPORTS AND ENERGY SECURITY

MONDAY, AUGUST 12, 1974

HOUSE OF REPRESENTATIVES, AD HOC COMMITTEE ON THE
DOMESTIC AND INTERNATIONAL MONETARY EFFECT OF
ENERGY AND OTHER NATURAL RESOURCE PRICING OF
THE COMMITTEE ON BANKING AND CURRENCY,

Washington, D.C.

The committee met, pursuant to notice, at 10:15 a.m., in room 2222, Rayburn House Office Building, Hon. Thomas M. Rees [chairman], presiding.

Present: Representatives Rees, Stanton, and Frenzel.

Also present: Dr. Douglas R. Bohi, Dr. Milton Russell, and Nancy McCarthy Snyder, consulting economists.

MR. REES. I think we might start. This is the Ad Hoc Committee on the Pricing of Energy and Other Natural Resources; and what we are doing is hearing the summary and recommendations of our petroleum task force on parts I and II of the study.

I do want to make it perfectly clear—that these are the first two parts of, I believe, a six-part study; and that we will be continuing into the area of other natural resources, such as copper and bauxite, uranium, et cetera, and we will also be doing an extensive study on the international and domestic monetary problems of this arbitrary pricing. And, we will also be looking at the effect of petroleum pricing on lesser developed economies throughout the world.

Parts I and II have been contracted out to a group from Southern Illinois University, Dr. Russell, Dr. Bohi, and Ms. Snyder; and parts I and II are their work, and the recommendations are their recommendations. These are not necessarily the recommendations of the committee; we won't come up with any specific recommendations, I suspect, until all of the studies are over and we have had a chance to vote on each recommendation.

So, I would like to now turn the meeting over to the panel.

STATEMENTS OF DR. MILTON RUSSELL, DR. DOUGLAS R. BOHI, AND NANCY McCARTHY SNYDER, CONSULTING ECONOMISTS, SOUTH- ERN ILLINOIS UNIVERSITY, CARBONDALE—Resumed

DR. RUSSELL. Thank you, Mr. Chairman.

What we have done in our study is look at the problems of international oil and the pricing of international oil, and the problem of energy security for the United States. The general conclusion we have arrived at is that a positive policy for energy security is required in the United States, but it certainly need not include, and should not include, total self-sufficiency, or a large measure of self-sufficiency, in energy.

I do want to point out that this is an abstract and analytical study, it is not designed to promote legislation, nor is it designed on a programmatic basis, and therefore some modifications might need to be made in terms of implementation.

Our recommendations follow from the general goal of increasing the welfare of the Nation, which implies increasing efficiency in the use of resources. Now, this obviously involves a value judgment, and that value judgment in addition involves a couple of constraints that ought to be made clear.

First of all, we have argued that we should avoid any irreversible damage, including damage to the ability of the United States to engage in foreign policy free of pressures from oil exporting countries; irreversible damage to the environment; irreversible damage in terms of premature resource exhaustion in the United States.

The second constraint we placed on this study was that even though energy prices are going to necessarily increase compared to what we have known in the past, there should be no reduction in the level of life of the poorest of our citizens. So, there is that much, but no more, redistribution indicated as far as the study is concerned.

The recommendations that we are presenting today are to be taken as a package. That is to say, we suggest a number of things which, taken together, would improve the energy security of the United States; any one of which, taken out and enacted individually, might not improve the welfare of the United States. So, they should be considered as a package rather than as individual components from which one could pick and choose.

We have organized our recommendations under five general goals which we might mention before we turn to those recommendations.

The first of those goals would be to increase the efficiency of the domestic energy industry; the second goal would be to decrease reliance on foreign energy sources; the third would be to improve the climate of international trade; fourth, to protect against shortrun supply interruptions of the embargo sort; and finally, to enact measures to protect the poorest of the citizens of the United States.

Now, that's a general overview, Mr. Chairman, of the way in which we approached the study and the nature of the recommendations. We can proceed as you wish, either to go through the recommendations one by one, or to answer questions about the recommendations that are listed; there are 20 in number, and some of them might be of more interest, or less interest, than others.

Mr. REES. I think that probably the best way to proceed would be to go through the recommendations. I suspect you can do that in about 10 or 15 minutes; and then we can ask questions on the recommendations.

Dr. RUSSELL. Would you want to do the first set of recommendations?

Dr. BOHL. All right.

The first goal is to improve the efficiency of the market. Here the idea was—I suppose what we were trying to get at most, given some of the history of Government interference in the market in other ways, as well as in the energy industry—is to improve the confidence and efficiency of the market directly, rather than to impose other ad hoc measures which take account of existing inefficiencies.

So, our preference here in this goal is to promote the efficiency of the market, or to improve the market itself, rather than to try and patch it up, to patch up the shortcomings with a series of ad hoc policies. As a result, most of these recommendations may look rather indirect in achieving that goal, but I think they do come to that point.

The first is to limit vertical integration in the petroleum firms. We see this as a major source of potential problems in terms of limiting competition in this industry, and perhaps limiting, most seriously, competition and vitality in the crude oil production stage itself.

The second recommendation is to limit the horizontal integration of petroleum firms into other sectors, such as coal, nuclear power, and so on, of which they are doing quite a bit right now. Competition among products, which is just as important as competition among firms within a given industry in order to maintain that competitive edge. It is believed this is a serious source of a potential price problem in the future.

The third recommendation is to alter Federal leasing policies in a number of ways. In general these are to encourage more participation in crude oil production. It is being limited right now by the fact that crude oil producing firms have to come up with rather sizable bonuses in order to get into exploration of a given field. The capital requirements for exploration in the new major petroleum provinces of the world are also limiting them. These capital requirements plus risk are limiting not only the newcomers in the industry, but also the smaller firms.

As part of the package, if in fact we do increase by the various measures competition in industry, we see no reason at all why there should be price controls in the industry for crude oil or natural gas. Usually the justification for those controls is based upon a lack of confidence in the market itself, and given that we seek to improve that confidence, there is no reason at all to impose these other controls.

The sixth recommendation is repeal of the Connally Hot Oil Act that is probably something that is not too operative right now anyway, if I can borrow a term from somebody else. That particular act lent credence and validity to State market demand rationing control, which we think should be eliminated as well.

And finally, to eliminate preferences to U.S. shipping, which I think is pretty much embodied in the Jones Act.

Mr. REES. Well, those are pretty good recommendations, they are well balanced, enraging to both labor and management, and that is a compliment to your approach.

[Laughter.]

Dr. RUSSELL. Well, the second basic goal that we have is to reduce the reliance on foreign energy sources, to narrow the import gap that those of you who were with us on Friday heard us discuss at that time.

A number of policies can narrow that import gap, both in the present and in the future, without significantly decreasing the efficiency with which resources are allocated in this country; and those are the recommendations that we make.

The eighth recommendation is to provide extensive geological data on Federal land, both offshore and onshore to the extent practical both from private and from public sources, in order to increase, again, the ability of potential energy producers to get into the market.

This would involve a large expansion in Government expenditures toward geological surveys and elsewhere, and that expansion should be, according to this recommendation, funded by an oil consumption tax that we talk more about a little later.

The next recommendation in terms of narrowing this import gap would be to broaden and deepen government support of research and development energy technology. In the past we have allocated our R. & D. basically toward nuclear, basically toward the long run, basically toward basic research rather than operational research. It is certainly our view that we need to improve and increase the amount of R. & D., and we ought to do it toward the traditional fuels rather than toward the more exotic fuels.

The exotic fuels, and the work we are doing now, and the expenditures we are making now are those to get us from the year 2000 forward; the problem we face right now is getting to the year 2000, and so, reallocation of R. & D.—as well as enlarging R. & D.—toward the shorter term and immediate needs seems highly desirable at this time.

We would like in recommendation 10 to encourage further use of coal for electric generation, which implies several actions. It implies changing the Clean Air Act to permit the use of high sulfur coal when emissions can be controlled, where air quality itself will not suffer.

Unfortunately we have in the past limited ourselves, or not limited, but tended to limit ourselves to concern about input rather than output. Rather than concerning ourselves with how much sulfur goes into the fuel we ought to be concerning ourselves about what happens to the quality of the air around the places where the fuel is being used. Certainly in terms of increasing the production of coal, and the use of coal, one of the major goals is to eliminate the uncertainty in its use, both in terms of consumption and in terms of the problem the mine operators are having now in not knowing exactly what they can expect in the future in terms of environmental controls.

We further would suggest that to narrow this import gap we need to provide more certainty for domestic oil producers and domestic energy producers generally; and to do that we suggest a standby tariff—not an operative tariff, but a standby tariff—that would, on present expectations, hold the price of oil above the \$7 a barrel CIF in the United States.

Now, at present of course, imported oil is considerably higher than that. Imported oil, as we discussed earlier, could fall to a much lower level than that. We feel that a \$7 a barrel standby tariff—that is not a tariff of \$7 a barrel, but a standby tariff which would hold the price of oil imports at \$7 a barrel—is appropriate.

We would, as the next recommendation, eliminate the tax provisions that encourage exploration and development of foreign energy sources. We are at present financing to a degree through export credit and tax provisions of one sort or another the exploration for foreign oil which tilts oil producers toward foreign sources of energy. We suggest that that balance ought to be tilted back toward producing energy in the United States.

The next recommendation would have to do with eliminating discriminatory tax provisions favoring income received from production

of energy. This would include such things as the percentage depletion allowance; it would also include some of the other tax credits that are now existing for the production of energy, not only for the production of oil, but also for the production of coal.

Now, this would have the effect of increasing the cost of producing energy, and consequently it might have the effect of reducing the production of energy. It would also increase the price of energy. But, it would also tend to dampen its consumption, and it would also tend to bring about a more efficient allocation of resources as consistent with the goals we suggested earlier.

We do feel that for a number of reasons the consumers in the country do not have appropriate information to make wise decisions about energy consumption. The builders of homes have no real incentive to insulate them properly; the producers of various other capital equipment have no real incentive to make them energy efficient because consumers do not know enough to know what the long-term cost of built-in energy waste is going to be.

Consequently we would argue for legislation establishing perhaps minimum standards of thermal efficiency, or at least standards of disclosure to prospective consumers, on energy consuming capital assets.

And the final goal in this area—I mean the final recommendation—would be to impose a tax on the consumption of insecure energy, namely on the consumption of oil and natural gas to the extent it is imported natural gas and to use the revenues from that consumption tax to pay the costs of the Government programs that will be required to provide the energy security that we need. The rationale here is fairly straightforward. It is the energy consumer of the Nation who will benefit from energy security, and it therefore should be the energy consumers, in proportion to that energy they consume, who should pay the costs of energy security.

And consequently we would suggest a tax on the consumption of oil to cover the cost of extra R. & D., to cover the cost of some of the other recommendations that we are making to narrow this import gap.

And that is the set of recommendations consistent with the goal of reducing the reliance on foreign energy.

Ms. SNYDER. The third goal is to protect ourselves against short-term supply interruption. This protection can be handled without maintaining a policy of self-sufficiency by maintaining some storage and shut-in capacity. In keeping with this goal we recommend storage capacity be increased to an amount to cover 60 days of our insecure energy imports.

Specifically, under our projections for 1975, that would be about 1 million barrels a day from Arab sources. The cost of maintaining the storage should be paid for by the importer, and the price to be passed on to the consumer.

After this we would recommend establishing some shut-in capacity, immediately 1 million barrels a day. The capacity should be reviewed annually and be changed in accordance with the amount of imports that are judged insecure.

Petroleum reserves are extremely useful in this area, and great care should be taken that the full cost of the shut-in capacity should be borne by the consumers of energy, and not by the public as a whole.

Also, offshore placement would be very appropriate for this type of shut-in capacity.

Dr. BOHL. Goal 4 is essentially designed to increase interdependence among consuming and producing nations alike. Right now the incentive for trade tends to be more one way in favor of the consumer, and not so much in favor of the producer. So, the idea here is to increase the incentive to the producing countries in order to induce them to exploit their oil reserves. One way, and it seems to me a very important way, would be to encourage their investment in the United States; to actively encourage it, and to use the full credibility of the U.S. Government in order to reduce the perceived risk to oil-producing countries that are making that kind of investment. Past customs are such that they tend to abhor that type of investment, and I think that has now to be offset in some fashion.

Also in keeping with this, some mechanism has to be achieved, and this is going to require active Government support by all of the oil-consuming countries, to facilitate the recycling of oil dollars. We have heard in this room not too long ago of the magnitude of the dollars involved and of the risks that private institutions just can't handle. This recycling has got to involve active participation of governments; and that essentially means, most importantly, the United States.

The idea is, to repeat it again, if the oil producers become dependent upon the oil consumers in terms of incentives for trade, in a sense the blackmail goes both ways between buyers and sellers, as it often does in other markets. To reduce the leverage of oil as a political and economic weapon perhaps might be the best way to achieve security in the long run.

Dr. RUSSELL. The last goal that we suggested doesn't follow directly from the study, but does follow from our view of the world.

What we are describing here is a considerable future increase in energy costs in the United States, to the American consumer; and of course the American consumer has already suffered quite an extensive increase in energy cost. That is as it should be, in the sense that the real cost of energy, including the costs of security and the cost of resources, are in fact rising.

That does mean that we need to reassess, however, the levels of protection for income—not protection for energy consumption—but protection for income of the citizens of the country. And so, we would submit that the adoption of any program of this sort should take into account, for instance, changes in social security payments; changes in other transfer payments; changes in perhaps some of the tax laws. It should take into account the impact increased energy costs is going to have on the level of living of the very lowest income group. Energy security is not going to come cheap; it certainly is going to come from the consumer paying the price for it. The question really is whether we wish to have part of this burden fall on the very poorest of our citizens, and we would argue that probably it should not.

And that is the set of recommendations that we made available.

Mr. REES. Well, thank you very much. I do want to compliment each of you on part I and part II and your recommendations, I think that it is all very valuable work. I know it will not only be of help to this ad hoc committee, but to the Congress in general and will help the administration and industry.

I have been concerned about Federal leasing policy in that most of the bids are bonus bids. So, at a time when we are trying to find

enough money to develop resources, whether they be shale or offshore oil, that those companies bidding have to put their money out front, and that money goes to the Federal Government and is not used in the development of those fields.

I have also been concerned about the problem of vertical integration in that there is a tendency for the largest companies to get larger, and the independents to get smaller, or go out of business. And I think this is obvious in the present situation where independents have to buy expensive foreign oil to compete against some of the large integrated firms that have a low-cost domestic base.

I was wondering about the possibility of a leasing policy where you mix up your bid, whether you make it a bonus royalty bid, or you have the Government come in with a larger percentage of the takeout, instead of one-sixth maybe 25 percent, and then the Government going to auction on their takeout. This is done in California for the one-sixth in the field; it's also done by Kuwait and will be done by Saudi Arabia in terms of their takeout oil.

They could also cap some of the wells so that we do develop a strategic reserve. I was just wondering if a policy of that type—do you think it could open up the market so that you would develop independent refineries, pipelines, independent retail distribution outlets?

Dr. RUSSELL. I think what you are suggesting is quite consistent with our policy. As you suggest, right now most of the bidding—although the Department of Interior has announced it is going to do some experimenting with other types of bidding in the fall—most of the bidding is done with bonus bidding, which does mean that it is cash outlay at first. If we have diverse kinds of policies, that would certainly open up the market to smaller firms who would not have to provide the capital right at first; and it would provide the Federal Government with its royalty share which it could sell any way it wanted to.

The problem here, though—one of the problems—is in terms of transportation, because in order to get that oil to the market, there has to be access to transportation facilities as well. I is not clear in the law whether all oil pipelines have to be common carriers, and consequently this would reinforce the argument for disintegration of the industry between crude oil production and refining, and other aspects.

I would modify your suggestion in one respect, however. That is, I think that the shut-in capacity argument is quite desirable over and beyond the bonus bidding argument. I wouldn't tie the two together. In fact, I suggest that shut-in capacity could easily stand on its own as a desirable policy.

Mr. REES. Well, it's easier to shut in petroleum. I mean, it would be difficult to spend a quarter of a billion dollars on a shale plant, and just close it down.

So, probably we should shut in petroleum supplies, and concentrate on gasification of coal rather than shale.

Dr. RUSSELL. The cost of that shut-in is not that expensive, either, as it turns out. Just in "back-of-an-envelope" calculations—and these calculations are not in the study which, as I suggested earlier, moves more toward policy in the abstract, rather than detail—the outside costs, and that is the upper-bound cost, of shutting in a million barrels a day would be about 7 cents a barrel on petroleum consumption in

the United States. Now, that is not the capital costs, you understand; it would cost \$3 or \$4 billion to put it in place in the first place. But, the annual costs of shutting in a million barrels a day would require a tax on all consumption of about 7 cents a barrel to cover that continuing cost.

Mr. REES. That is in comparison to what cost for above-ground storage?

Dr. RUSSELL. Well, it's very difficult, maybe the rest of you can help. . . . It's very difficult to compare directly shut-in capacity to above-ground or salt dome storage because shut-in capacity will be available for the indefinite future, you don't use it up in 60 days, or 90 days. It's available there until you finally get ready to pump the last of the oil.

In storage, on the other hand, you are talking about capacity for 60-day consumption, or 90-day consumption, or something of that sort. So, it's difficult to compare the costs of the two.

I would suggest, to add to it, an appropriate energy security policy would be a combination of shut-in capacity and enough storage to get us over a short-term embargo.

Mr. STANTON. We don't worry too much about salt domes.

Mr. REES. They know more about it than I do.

Mr. STANTON. I'm intrigued about that. We have in my home town, on the shore of Lake Erie, some of the largest mines. They have about 100 miles in our county and out into Lake Erie. I was in the mine about 8 or 10 years ago. It looks like a city; there are streets named after New York City; Broadway, and so forth. It is a most intriguing place, large removal equipment goes down never to come out. But, it's a fantastic storage facility, really unbelievable.

Dr. RUSSELL. It turns out to be a very cheap way of storage, in salt domes. Most of it, in our study we assumed, is going to be used for storage commercially, and it's not going to be available for emergency storage, as you suggested before. But, the salt domes do not necessitate mining, they pump water down there and take it out as brine and you have a hole. You fill it with oil and pump water in it to push the oil out and you have a larger hole than you had before.

Mr. STANTON. They say it's a little over a hundred miles.

Ms. SNYDER. The capacity is about 650 million barrels of storage in salt domes; and about 200 million barrels of natural gas liquids are being stored in salt domes, right now. In the future that amount should increase. But, it costs about \$1 a barrel to store oil for a year in a salt dome.

Mr. STANTON. In lands closer by—they are taking out salt brine and moving in natural gas. In larger areas they are doing that now.

Mr. REES. On your tax policy you would do away with, or substantially reduce the foreign tax credits on petroleum, and I take it, you would remove or reduce the depletion allowance as well. What about the drilling costs?

Dr. BOHL. The intangibles?

Mr. REES. The intangibles, yes.

Ms. SNYDER. Yes; we would recommend that the tax policies that provide special treatment of the industry disrupt the market to the extent that the price of energy does not reflect the cost of producing the energy. To allow the expensing of intangibles and dry holes maintains a reduced price, you know, and has an influence on the price.

Mr. REES. So, you would merely depreciate your assets like any other business depreciates the assets, and deductions for dry holes would be deducted as any other business expense is deducted.

Dr. RUSSELL. Or capitalized. In intangible drilling costs, the tax break comes from expensing rather than capitalizing it, taking it over the life of the asset. So, you have the interest saving involved from the early capital due to tax deduction involved.

And the foreign oil credit is beginning to get much less important as time goes on.

Mr. REES. Takeovers?

Dr. RUSSELL. Because of the takeovers.

Mr. REES. Well, then you take away in terms of taxes, but then you eliminate all price ceilings, both on natural gas and on oil.

Dr. RUSSELL. Right.

Mr. REES. Now, on natural gas you were talking about a 70-cent MCF cost on Friday?

Dr. BOHL. No, we were talking about something less than the LNG; other than that, it's relatively insensitive to the unregulated price of natural gas. We expect it to be something less than \$1.25; we don't have any specific projection or estimate of what the unregulated price is, although we do refer to other studies that do put it around 85 cents, or less sometimes.

Mr. REES. So, if the intrastate price is at the present time \$1, or \$1.10, are the prices artificially high because they are looking for a constant source?

Dr. RUSSELL. I suggest that those high delivery prices have been created by a long period of regulation of the natural gas industry, created by the energy crunch of this last year, and created by the failure of nuclear power to come on. And so, what we have had is a surge of demand in the natural gas field, which, because of the long lead time involved in changing capital equipment for gas consumption, and because of the long lead times involved in increasing energy production and natural gas production, created a short-term blip, if you will, in the price of natural gas. The long-range equilibrium, as I suggested earlier—according to other studies, we haven't done any study on that—comes closer to 85 cents an MCF.

Mr. REES. Now, if you had an unregulated price for all oil you feel there wouldn't be any more necessity of Federal allocation?

Dr. BOHL. That's right, then the market would do the allocating, rather than specific Federal officials.

Dr. RUSSELL. It would certainly remove also the problems of particular producers and particular consumers and particular places; it would remove the problems of the independent refiners, for example, having inordinately high prices for their input, as compared to the majors. And, it would prevent the problem on the east coast where they are having to depend to a much larger extent on imported and more expensive oil.

Mr. FRENZEL. Why would that relieve the problems of the independents?

Dr. RUSSELL. Deregulation?

Mr. FRENZEL. Yes.

Dr. RUSSELL. Because they would have an even shot at whatever oil existed. At the present time the majors, because they have a larger

proportion of regulated oil available to them, have lower refinery costs than the independents. Consequently they are able to carry that price through to the gas station pump, or oil pump, or home heating, and are able to hold a lower price than the independents can hold.

Mr. FRENZEL. How is that going to change?

Dr. RUSSELL. Because the independents will be able to purchase the oil just as the majors are going to purchase the oil.

Mr. FRENZEL. Where are they going to purchase it?

Dr. RUSSELL. They will be purchasing that on the open market.

Mr. FRENZEL. How are they going to move it, how are they going to refine it?

Dr. RUSSELL. Well, I thought your question had to do with the independent refiners because they have been squeezed because they have a disproportionate—

Mr. FRENZEL. I am talking about the independent refiners. I come from the State of Minnesota, where our independent refiners are relying on Canadian crude oil.

Dr. RUSSELL. Right.

Mr. FRENZEL. In any kind of a situation that I can envision they are going to stay reliant on Canadian crude; they are always going to be. As far as we can see ahead, they are going to be delivering a higher-priced product than the majors. Standard of Indiana, a major marketer out of Chicago, or out of the Southwest, or out of storage or refining capacity on the Gulf Coast, has got to come in at a lower price; you are not going to change that at all.

Mr. REES. Sure we will, all the oil then gets to a national price and stabilizes at \$8 a barrel.

Mr. FRENZEL. It doesn't if Canada still gets—

Dr. BOHI. The national price will also have to stabilize in accordance with the world price.

Mr. FRENZEL. That is not going to happen. If Canada is paying Persian Gulf prices on the east coast, they are going to leave their premium tax on, and we are going to have to pay it.

Dr. BOHI. But then the U.S. price will rise up to the world price as well.

Mr. FRENZEL. Well, it won't according to you because it's too high.

Dr. RUSSELL. It will in the short run. In the long run the world price will tend to fall. But, oil does flow, and it moves from market to market, and the price would equilibrate over time. Now, what you would have would be—

Mr. FRENZEL. In the meantime I will have four broke refineries.

Dr. BOHI. They won't be discriminated against.

Dr. RUSSELL. We will have increases in price of production for users in the United States, but the smaller independent refiners will no longer be discriminated against, as Dr. Bohi suggested. Now, perhaps the goal of having everybody pay a higher price is not necessarily a desirable role for the consumer, but at least the small refiners are not going to be put in the same squeeze as before.

Mr. REES. Mr. Frenzel, if they freeze the prices as of a certain date, so that in Los Angeles—and I mentioned this Friday—you have four stations at four corners, they are all major stations, and they all have a different posted price. We have a law in the city, we have to have a big posted price, so people can see what they are paying, and there will

be as much as 6 cents a gallon difference if they are frozen as of one date. And each price really reflects the combination of how much is imported and how much domestic crude is in their refinery mix.

Mr. FRENZEL. Well, I agree that those problems exist, but I guess I don't think that simply letting the Allocation Act solve the problem—

Dr. BOHL. As an individual policy, I agree with you. What we are looking at is a package of things, taken together, rather separately.

Dr. RUSSELL. Along with that package, we are including the whole disintegration of the major oil firms to give not only your small independent refiners an even shot at the market, but the different majors an even shot as well.

Mr. STANTON. And you are saying your presentation is a package, and to adopt some without the others would create more problems.

Dr. RUSSELL. That's right. Not necessarily will create more problems, but might create more problems.

In a sense we got into the situation that we have today because of a series of ad hoc, piecemeal, shortrun kinds of policies where people are looking only at a small piece of the elephant. To get out of the situation we want to get out of we are not going to be able to do so, again, by adopting a series of piecemeal ad hoc programs; we will end up, if not with the elephant, the camel, if we continue this kind of approach.

Mr. STANTON. Leave it up to Congress?

[Laughter.]

Dr. BOHL. On the contrary, they are the only ones that can set the thing straight, now.

Mr. FRENZEL. Our track record would not indicate that.

Dr. RUSSELL. I might suggest, though, there is a good reason for your track record, and that is, until the present there has not been—and by the present I mean the last 6 months—there has not been a national focus on this package of issues. Consequently Congress has had the issues brought to its attention on a piecemeal basis, dealing with one special problem, or one special interest, at a time.

At present, though, you do have a national focus, and consequently perhaps a better chance of avoiding some of these problems you describe.

Mr. FRENZEL. But, the Congressional Record says that we legislate results. So, we will pass a bill that says everybody will have lots of cheap gasoline; the little businessman will make lots of profit, and all the big guys will be skinned right down to the bone. That's what our law will say.

Mr. STANTON. Backing up a little bit to Friday on the subject we are on right now, I wanted to clarify in my own mind—you made it clear from your observation on the balance of payment problems of the United States, we should not be as alarmed as we thought we might be. You didn't—or, I missed your thoughts and observations on other countries, could you elaborate on that?

Dr. BOHL. I suppose that it should be pointed out that leaving out other countries is another narrowing of our focus here. We intended here only to concentrate on U.S. problems, and as a result the recommendations and conclusions are strictly with respect to the United States; and the comments about the balance of payment are from the same narrow view.

On the contrary, the rest of the world is in a terrible position as far as the balance of payments are concerned. Our conclusions refer only to countries like the United States, which have some capacity to produce, and who at the same time are going to be likely recipients of a bulk of the recycled PETRO dollars—the rest will suffer. However, in order to sort of keep the circle going there has to be some reason for the oil-producing countries to continue the recycling; they've got to have an incentive to produce, otherwise, they just simply gradually cut back production, and that of course eliminates the balance-of-payment problem. Then you have the "where is the oil" problem.

Similarly, in order for the lesser developed countries and some of the other developed consuming countries to continue their purchases, the foreign exchange has got to be recycled back to them. Finding the mechanism for doing that is going to be very difficult. As I see it, it's got to involve central banks participating in some cooperative effort.

So, I guess we tend to pass it off for the United States as a manageable, but not necessarily—let me just say as a manageable problem; but it's manageable if we assume the world will cooperate.

Mr. STANTON. Did you read the Rockefeller article in U.S. News & World Report?

Dr. BOHL. Is that the one based on the Williamsburg speech?

Mr. STANTON. That the answer lies in a world bank system.

Dr. RUSSELL. I might just note that while our focus was on the United States, and our recommendations are on the United States, I don't see any of the recommendations here inconsistent with the well-being of the other oil consumers in the world. In fact, one of the arguments we make strongly is that if the United States is not prepared to accept investments of the PETRO dollars, for example investment in U.S. equities, then the rest of the world will be considerably worse off.

So, we are not narrowing our focus and abandoning the rest of the world.

Mr. REES. This is getting into parts of our study that will be forthcoming in the next few months, but on the primary recycling, the basic problem is that the PETRO dollars are recycled, obviously they are recycled back to the strongest currency, the strongest economy.

Dr. BOHL. Yes, sir.

Mr. REES. And so, if money is recycled into the U.S. economy, basically we will be taking away from the Indian economy, or whatever it will be. And there is a problem of investing in other countries because if you pick up too much of their economy, foreign money picks up too much of it, then they will be in a situation where they will be taken over; that happened to us in Chile and Peru.

One way might be to have some of the mutual fund operation working through the International Monetary Fund, where you would take your PETRO dollars and invest in the mutual fund, and then the mutual fund would be a whole basis of various investments in both rich countries and poor countries; but at least you will have some system of allocation because the investments would be International Monetary Fund equity investments, or debt investments, and it would be very hard for one country to take over an International Monetary

Fund interest in a local concern. And then we could then get around this problem of whether a country is socialistic, or capitalistic, or whatever it might be; and then you can guarantee a return on the investment of at least what the EURO dollar interest rate might be.

In this way, I think, you could put clean money into lesser developed economies without the problem of exploitation.

Dr. BOHL. The United States has always naturally acted as a financial intermediary to the world. Even if the money came in on a private basis, as it has in the past, it is likely to flow back to the rest of the world in various ways.

Dr. RUSSELL. We shouldn't forget, though, that there is, underneath all the monetary and financial activities, a real asset flow going on. The reality is that the oil-exporting countries of the world are getting claims on more of the world's goodies than they had in the past. And so there is a real transfer of resources, whether those be current resources in terms of goods exported to the oil-exporting countries, or claims on future resources when they purchase capital assets.

So, there are real problems here, over and above the monetary problems; and it's the real problems the world should be focusing on, rather than the process by which the flow takes place.

Mr. REES. Getting back to goal 1, we are talking about vertical and horizontal integration. What would be the effect in vertical integration if you broke up the producers from the refineries, from the pipelines, from the distributors?

Dr. BOHL. We would have a lot of mad oil executives, I guess.

The idea there, is, of course, to limit market control. I suppose that would be the first effect: to force what are now integrated refineries, producers, and distributors to become competitors, so that the oil they pass on from one stage to the other really is bid for in the open market just as the independents have to bid for it. The transfer price, then, would not be controlled by the same firms, but rather would result from the bidding process.

Dr. RUSSELL. If I could comment on that. One of the things that is most striking, perhaps, looking at the oil industry is that for the producer producing crude oil or producing natural gas, the precondition, or potential, for competition exists. Now, these preconditions or potentials for competition over the years have been hampered first by the state prorationing program; second, by the oil import controls; and then finally, and perhaps even to a lesser extent than by the first two, by the integration of major firms.

Now, eliminating vertical integration would be the last step, if you will, in providing competitive entry into that industry. State prorationing no longer is restricting output, nor is there any import control. So, here we would have, I think, a viable competitive industry that would make it possible to eliminate a lot of the other constraints placed on it.

Mr. REES. Eliminating vertical integration, would you eliminate vertical integration across the board?

Dr. RUSSELL. There are a number of arguments along those lines. I understand that the chief executive of Ashland Oil last week was suggesting that refining and marketing should be kept together, but that you should separate out transportation and production of crude oil. Ashland, of course, is a large refiner and marketer, and does very

little producing, which has perhaps some implications in terms of his recommendation.

Clearly, I think, that the most important division is between production and the rest of it—I don't know if either of you would agree.

Dr. BOHL. It is hard, though, in the sense that competition downstream is important for competition in the production stage itself. So, it's not easy to separate out these stages.

Dr. RUSSELL. I would argue, though, that the major cause of our energy crunch in 1973-74 was because we were short of refinery capacity. And the reason we were sort of refinery capacity was that independent refiners and other refiners recognized that they did not have a handle on domestic crude—they couldn't get the domestic crude they needed; the import controls prevented them from bringing in foreign oil; and consequently we had no grass roots refining capacity built in this country for years upon years, upon years.

And that if we would have had an open market for crude we may well have had a lot more independent refiners available—which is not to say there is not an enormous capital barrier to entry, it certainly does exist.

Mr. REES. On the horizontal integration, there are fairly obvious reasons why the major oil producers should not go into nuclear, coal, and other areas of energy.

How far would you limit the horizontal integration? For example on shale, converting shale to petroleum, you wouldn't want to break that step, would you? Nuclear energy of course would be something else, or coal, gasification of coal; some are direct connections, and others aren't.

Dr. BOHL. Some of the problems would be eliminated in turn here. If we in fact don't have any vertical integration, when you get to the horizontal integration you wouldn't have the problem of having oil refineries linked up with oil shale production. It would presumably be independent.

But as far as, specifically, how far you go in any of these recommendations, how you implement them, that is another class of problems we have barely even begun to scratch the surface on. Each one of these problems would require a great deal of study.

Dr. RUSSELL. I would like to make one comment on that. I am not nearly as concerned about oil companies and oil shale as I am oil companies and coal, partly, practically, because I don't see oil shale as being that important for a considerable period of time. Now, coal is important, and it is important shortrun as well. So, oil shale for a generation is going to be a minimal contributor to American energy security, and it doesn't make that much difference.

Mr. STANTON. On that relationship, to carry it further, you did state we should reallocate and expand upward, develop energy away from nuclear energy.

We have an electrical company at home—they have made the point that nuclear fuel will make a significant contribution in the future. Do you disagree with them?

Dr. RUSSELL. I certainly wouldn't disagree that nuclear is going to be quite important in the future. I would argue that we have perhaps spent too much money on nuclear in the past, that the billions that have been poured into nuclear technology were probably 10 or 15 years

ahead of their time, and they would have been much better spent for developing means of using coal, because it is still true, even at the very high prices for fossil fuel today, that the kilowatt hours coming out of nuclear plants are more expensive than they are from a fossil fuel plant.

One of the reasons—perhaps not a reason—but one explanation of the electric power industry's interest in nuclear is clearly this: they are able to control the capital investment. Nuclear has much higher capital costs, and much lower operating costs. They throw the whole capital cost in directly. The company itself is independent from purchasing from the outside. I would also think they would choose the nuclear route given the regulatory structure they have. Thus far we would have to say in fairness that nuclear—well, I can't vouch for it, I haven't looked at it myself—but the quip is there was more energy consumed in building nuclear plants than nuclear plants have produced. Now, as I say, I can't vouch for that fact, but I wouldn't find it unbelievable.

Mr. STANTON. Has there any study been made, or are there statistics available of the price of gasoline at the pump in relationship to the rate of consumption?

Dr. RUSSELL. Do you want to talk about that?

Dr. BOHI. Yes, there have been a number of studies: none of them are completely satisfying. In the past we haven't had many changes in price in order to link up with changes in the rate of consumption. And also, that relationship between price and quantity consumed assumes everything else staying constant, like population and income, and all of that; and of course none of that holds still for us.

Nevertheless, there have been quite a number of studies, and they all tend to come pretty much to the same conclusion. First of all, they are broken down into two time frames. One would be a shortrun response: how much is a given percentage increase in price today likely to yield in percentage reduction in consumption within a few weeks, or a few months? The conclusions there are that the relationship is about $-.1$ to $-.2$ or $-.3$; that is to say, a 1-percent increase in the price yields, .1- to .3-percent reduction in quantity demanded.

Whereas the longer term reduction necessarily would be larger because the consumers have the ability to adjust to higher prices by altering the way they consume energy in many more ways than they would in the short run. And studies there place the elasticity between $-.4$ and $-.7$; that is, a 1-percent price increase leads to a .4 to .7 reduction in the quantity demanded.

I think certainly that was the estimate that went into, for example, the Cabinet Task Force where they were studying import control. The Chase Manhattan Bank has just published those kinds of numbers not too long ago. I can supply you with the references if you want to go into some detail. The elasticity we used is the midpoint between those, $-.5$.

Dr. RUSSELL. I might note that the demand, the elasticity of demand, for oil products other than gasoline is more elastic. So that our midpoint takes into account—the $-.5$ takes into account—demand for fuel oil and other petroleum products. I believe gasoline is the least elastic.

Dr. BOHI. That probably is the major part.

Dr. RUSSELL. I might just note that we have seen fairly obvious evidence of demand elasticity in the United States in the last 6 months when consumption of gasoline has dropped, even though there has been an increase in population, an increase in the number of automobiles, and the automobile mix has not shifted significantly. It's not because there are more smaller cars that we are actually consuming less gasoline than before. Now, again, that data is muddied by the recession going on.

Mr. REES. Are there any more questions?

I was wondering, there might be some members of the audience that might wish to ask some questions, and some of them might be more expert than we are in posing questions. So, I might ask, if anyone would like to ask questions, if you do, please give your name and affiliation so we know who you are.

Any questions?

Mr. SCUKA. My name is Scuka, congressional research, Library of Congress.

There were quite a few points made on Friday, and you dispelled many today. I have one item I would like to start with and that is—

Mr. REES. Speak up a little louder.

Mr. SCUKA. When you were discussing price Friday, under many conditions, or many possibilities, were you referring to a current price in terms of open operations and domestic prices, when you were speaking about 1980 and 1985, or were you referring to some other price?

Dr. RUSSELL. Are you asking the question of whether we use constant dollars or current dollars?

Mr. SCUKA. Right, constant dollars.

Dr. RUSSELL. We were dealing always in constant dollars, in 1973 dollars.

Dr. BOHI. Yes, 1973 dollars.

Dr. RUSSELL. So, that doesn't take into account any inflation taking place from 1973 forward.

Mr. SCUKA. I am sure that in that context Secretary Simon meant constant dollars, too, when he mentioned \$7.

On the project of independence, after hearing you today, I am convinced that you are not in any way supporting it because you found it economically unrealistic within the time framework. I wish somebody had suggested the project semi-independent at the time.

You have mentioned two other major considerations, one a quota, reimposition of a quota, should conditions evolve where the domestic U.S. price should be protected; and the other one, the alternative, to go to a tariff system.

Do I take it that you are not in favor of reimposition of the quota?

Dr. BOHI. That's correct.

Mr. SCUKA. The cost of that has been adequately confirmed in historical terms, and I don't think we should reenter that. On the tariff side today you mentioned, should the differential in the U.S. world price become such that a tariff was required, you would opt for that. Is that correct?

Dr. BOHI. That's right, on a standby basis, we indicated that if the downside risk of domestic producers has to be removed, perhaps the easiest way to do that would be with some kind of a standby tariff. We

did suggest a level that we don't think is likely to be realistically achieved in the foreseeable future. And the \$7 we don't think will be the landed price of imported oil, at least as we see it.

So, it is an imaginary thing but it eliminates the risks, the perceived risks, of domestic producers, of price going below that. It would be perceivable to have a price of \$3.

Mr. SCUKA. Would you foresee that as a temporary measure, or something that once set in would likely perpetuate itself?

Dr. BOHL. Of course if it's never ever used, except for a psychological effect, it doesn't matter.

Mr. SCUKA. Right, there is no argument on that. In terms of having a weapon at your disposal, it's already a credit to the system; but, if it were to be used on the international level, any tariff in direct proportion to the level would create side economic problems in terms of our own total industry competitiveness in the world market.

Dr. BOHL. That's true.

Mr. SCUKA. And that, institutionalized, could become a greater danger that we might face.

Dr. BOHL. That's true; and a proportionally greater danger in the quota. That is why it is not recommended at all.

Mr. SCUKA. Thank you, I'll pass on, perhaps somebody else has some questions.

Mr. REES. Well, you will get away with a quota probably easier than you will get away with a tariff, I mean, with a tariff you run into GATT.

Dr. BOHL. The quota is in GATT, too, quotas and tariffs. All of these treaties also have the subclauses on national security. So, given that a tariff falls into that category as well, there is no real problem in terms of the treaty itself.

Mr. REES. We have had an oil quota for years.

Dr. BOHL. Yes, on national security grounds, and that is why there was no GATT problem.

Mr. REES. In the context of Project Independence, isn't that a public relations gimmick more than anything else? I mean, it's obvious we have to increase our domestic sources to protect us against the insecurity of shutoffs, or arbitrary price increases. So, do you think at any time the administration was thinking of absolute security?

Dr. RUSSELL. I certainly wouldn't want to second-guess the administration, what its goals were.

Mr. REES. It's kind of hard to second-guess—well, I won't go any further.

Dr. RUSSELL. But, certainly in terms of the costs versus the benefits, it would appear to us that self-sufficiency is one of those things that it is better to talk about than to create. When you recognize what the resource cost is in the United States in the long run—marginal barrels are approaching \$10 a barrel if we get enough output to reach self-sufficiency—self-sufficiency requires an enormous real resource cost when it might be possible instead to pick up cheaper imported oil during periods when the OPEC oil price falls.

Of course there is the other point, too. That is, if we do opt for actual self-sufficiency, and we do tie ourselves to \$10 oil in the United States, it is going to place the United States in a severe competitive disadvantage in the event that the OPEC cartel in fact falls, and the

other oil consumers of the world get oil at a resource cost of \$3, \$4, or \$5. That would be especially painful for our energy intensive export industries.

Mr. REES. Then the cost of production, what we are talking about, it is too high in shale and gasification of coal, it is very high and very difficult to bring them into production, and then to stop that production; it is relatively labor-intensive, too.

Dr. RUSSELL. That's right. The political problems of closing down a shale plant would be. And then attempts to reinstitute it sometime in the future would be intolerable. You just can't put 2,000 people to work out there in Colorado and suddenly turn them off; and turn them back on again.

Mr. REES. So, probably in any policy there will come a time when you want to limit your expensive research development so it doesn't put you in an inflexible position in terms of importing cheaper energy.

Dr. RUSSELL. That's right. In terms of the next 10 years you really have to face the fact that we are, in essence, a fossil fuel economy, and in essence we are going to import a very large proportion of our energy, almost under any circumstances.

The question then is, how do we do it in such a way as to minimize security risks, and to minimize the total resource costs to the United States. One way of doing that; and to avoid at least the political problem, is to enhance storage and develop as rapidly as possible the shut-in capacity of the United States. That shut-in capacity would make ourselves secure from that political embargo.

Mr. REES. Have you made any specific recommendations on how much shut-in capacity we should have?

Dr. BOHL. Well, it should be linked to the volume of import.

Mr. REES. What would be the percentage in terms of barrels per day imported now, about 8 million barrels a day?

Dr. BOHL. A little over six.

Dr. RUSSELL. We argued for about 1 million barrels a day shut-in capacity at the current rate of imports.

Mr. REES. What do we have now, one in Alaska, and Elk Hills.

Ms. SNYDER. Elk Hills right now can produce in 60 days about 160,000 barrels a day; and it's estimated that with about \$300 million investment, that it could produce 350,000 barrels a day.

Mr. REES. For how long, how extensive is that?

Ms. SNYDER. The estimate, I think, is for 5 years they could maintain that very high output; but there are doubts about that. The total estimated reserve, I think, is about 1.4 billion barrels.

Dr. RUSSELL. And the North Slope of Alaska stuff is really not accessible because not only does it have to be drilled, we have to have the pipeline, the transportation facilities, and then the receiving facilities on the west coast. So, in a generational sense, that will be years away.

Mr. REES. So, we probably need another 60 percent increase in shut-in capacity.

Dr. RUSSELL. At a minimum. I would suggest it come from Government purchases of private fields that are already existing and ready to use, as well as Government development of the Outer Continental Shelf, or Government development of other either public lands or private lands.

Mr. REES. Now, you suggest that the Government could pay a private developer a fee for keeping shut-in capacity.

Dr. RUSSELL. That would likely turn out to be the most economical way of providing the reserves that are necessary.

Mr. REES. That would be a market interest on the amount that might be drilled that year?

Dr. RUSSELL. That might be produced that year.

Mr. REES. Produced.

Dr. BOHL. There is a regular organized market right now in selling what you may have found, to somebody who is equipped to produce or refine it. The Government simply enters that market and buys the reserves that have already been, if not drilled, at least sized up as to capacity.

Dr. RUSSELL. Of course, there would be continuing costs involved in maintaining the pipelines, and maintaining the wells in shape. Some geological structures would be satisfactory for holding and others would not. Some have tendency for well bores to sand up while others flow fairly easily, and so forth. So, it couldn't be just any reserve; some of them you have to continue to use.

Mr. REES. Fine. Are there any other questions, Jim?

Mr. SIVON. Yes, I have a couple questions.

When Mr. Winger was here from Chase, he said by 1985 we should be 85 percent self-sufficient. Now, give me your analysis. I think you disagree. Can you give me any specific percentage of self-sufficiency by 1985?

Dr. BOHL. Well, given the price assumptions we made, and so on, our best guess would be, if there were no interference, around 35 percent of consumption, which is approximately what it is now.

Dr. RUSSELL. Imports.

Dr. BOHL. That would be imports.

Mr. SIVON. That's giving your market analysis. But, do you think we should—

Dr. BOHL. There's a good question. We really didn't face the matter in terms of what do we recommend as a desired level of self-sufficiency. We didn't in fact think we were capable of giving any better answer on that than anybody else. The best we can do is say how much different levels of self-sufficiency might cost, given different methods of achieving them.

And certainly we concluded that complete self-sufficiency was too costly, given the use of import control, or subsidy approaches. But, as far as, "how far do you back down from that?" "what do we guess?"—it may be any way down to 35 percent.

Mr. SIVON. The other question I had dealt with consumption tax, a little more specificity there. Who would administer the tax, and what tax level are we talking about?

Dr. RUSSELL. Probably the easiest thing to do would be a tax that would move into the price at the refinery. Again, we didn't attempt to design an actual tax.

You might be interested to know what rate of tax we were talking about to meet these goals. To meet the goals of 1 million barrels a day shut-in capacity, to provide \$2.5 billion a year extra R. & D. for energy research, and to provide \$1.2 billion for those low-income

problems that we described before, would require something like 67 cents a barrel tax.

Now, we are talking about 1.5 cents a gallon tax, which is a relatively small tax when you look at the current highway taxes, and other taxes on gasoline. Of course that tax would be proportionately much greater on other fuel.

In terms of the costs of providing 60-day storage of insecure oil, that is Arab oil, it would cost about 40 cents a barrel on that which is imported—not over all 17 million barrels—but on that imported and provided for storage.

So, these are not—when you are talking about Project Independence kinds of figures—these are really not that exorbitant a cost.

Mr. SIVON. Thank you.

Mr. WHITE. I'm Tom White, on Congressman Hanley's staff. I don't know if you have done this on purpose, or not, but you ignored completely solar energy; is that because the technology costs are too extreme. If this is the case, would you then for 10 or 15 years go through gasification of shale, and then to nuclear energy, and then to solar energy?

Ms. SNYDER. I think we ignored it in the time frame, we are considering up through 1985, and we don't anticipate that solar energy will make a significant contribution to energy before that time.

Dr. BOHL. Also remember that in order to use it beyond 1985 some new technology has to be developed that we don't know anything about. We preferred not to make any guesses of that sort.

Mr. SCUKA. Two more points I would like to offer. One, have you considered the formation of a national corporation for the specific task of managing either the shut-in possibly, or the actual storage, so that you remove that from private hands; payments, fees, instructions, or regulations have notoriously been ignored, distorted, or just simply not been followed.

The Government owns, the Government has absolute right to the offshore areas, has it not; and onshore we have Federal lands, or public lands where the Government can intervene and has administrative authority over, without precluding the continuation of the oil industry to remain in private hands. The constitution of a public oil corporation, national oil corporation would give a working, functional organization where by starting with a lease, which would exclude bonuses, but would include royalties dues, royalty production dues; the corporation could elect not to produce a certain amount of royalty oil, not to lift it in any given period of time, and that would be part of the national reserve, the producible national reserve, administered by the Government.

It would eliminate fees; it would eliminate cost accounting, although we could still, if we wanted to, establish a certain cost pattern to the operation. But, it's just something that should be considered, and should be considered because the same situation, it is now under review, and it has been presented as a law in the Canadian Parliament; I expect it to be functional before the spring of next year. Obviously it is the embryonic stage, but it will have the same consideration, will have among the operations of the private corporations a government arm that will be interested, itself, only in having secured delivery in case of emergency.

Dr. RUSSELL. I can comment on that. First of all, we did not think it was our mission to try and describe processes by which the goals could be achieved; and so we did not attempt to develop the institution of a Federal corporation.

Now, I can make some general comments, first of all with reference to storage. The important elements with reference to storage are that stored oil be capable of moving immediately into the same channels of distribution so as to take the place of that oil which is interrupted. The feasible way of doing that is to have the importers themselves handle the storage, and pass that storage cost on to the consumers; and therefore you wouldn't have the problem of the storage being at point A, when the refinery is at point B.

Mr. SCUKA. My scheme would not have that problem. My scheme would be entirely consistent with the fact that you do develop a field, but once the field is developed you must provide pipelines to move it; and, say, 10 percent, or 5 percent, or 15 percent of the production that the Government would choose not to produce would have accessible all the downstream movement that's necessary to put it immediately into utilization.

Mr. REES. We have been considering that in the Ad Hoc Committee in terms of Federal leasing policy on the Inter-Continental Shelf where the Federal Government takes more than their one-sixth, takes whatever they think is necessary, or whatever the geological formation would justify; and then becomes more or less a joint venture between the Federal Government and the private company.

I ran that out to a couple of companies. They weren't "the majors," but they were multi-million-dollar companies—in the legislature when they have oil fights we say it's the millionaires versus the billionaires—but these were substantial national companies. They thought that a joint venture both in shale and in the Inter-Continental Shelf wouldn't be a bad situation. I thought the reaction would be totally negative, but it was not.

Mr. SCUKA. They were accepting it in principle?

Mr. REES. They were accepting the principle. We do that in California, not for storage; but we can take our oil and auction it off. We do that to keep the independents busy. Unfortunately we have some problems in the Federal Energy Administration, they won't let us auction off our oil in the market because they say the price will be higher than the old oil price at an auction, and we are now in the midst of fighting that.

But, the way I envision it is somewhat the way you envision it. I don't know if a formal corporation has to be put together. I'm always afraid of forming something like this because just having a Federal corporation gets people nervous because they think a Federal corporation would be actively competing with private enterprise.

Mr. SCUKA. I'm not minimizing the political problems.

Mr. REES. I'm not minimizing political problems; but I'm dealing with realities.

But, I think without even forming a Federal corporation, in fact without even passing a law, that the Federal Government today could take more than one-sixth in interest and could store that, or could put it out to bid. I don't think there is anything in the statute today that would prevent that.

Mr. SCUKA. The way they can come up with a leasing regulation, they can come up with some other regulation consistent with the authority that they now have.

Mr. REES. With the authority they now have they can go into a policy like that without any action by any legislative branch.

Dr. RUSSELL. Let me suggest one problem with that policy, a problem perhaps in the abstract, but one I think very serious. That is that the tendency would be for those resources to be transferred without bonuses, which would imply that part of the cost of that oil offshore would come out of public domain, domain owned by the taxpayers of the country. The tendency would be, then, to transfer it finally to the consumers at a price consistent with getting the resource free in the first place.

I think one of our problems has been the underpricing of energy in the past for reasons such as this, and our tax laws. And that you would end up with far too much consumption of energy; energy security would not be charged to those who benefit from it—to consumers. So, the public domain ought to be kept public; and the funds from public domain should be transferred into general funds and not cover the cost of energy security.

Mr. SCUKA. My scheme does not have that problem, perhaps you did not understand clearly the position. If the Department of Interior, or the White House, for that matter, takes the position that you not accept a bonus, but you tie the results of exploration into the future production accruing to the Government, at a given level, as Mr. Rees suggested, at a reasonable given level, that is a money transfer which could be handled as bonuses are handled now, or in some other fashion. That would be a real asset to retain by the public domain, and channeled into, whether emergency supplies, or to play a part in the shut-in costs, or whatever else. But that is an administrative problem, it's an administrative problem concerned with any other tax problem.

I have one other point which I would like to offer as part of my own study over the past several years, referring to the price of oil, the current price of oil, denominating dollars, yen, or whatever else.

It seems to me, if you look at the world situation, the world price situation, the world commodities, including gold, you will find that last fall and this past winter it reached a natural equilibrium between the gold price and the petroleum price. It's almost at the point of indifference, what we call economic indifference.

In support of my theory, I have information from the BIS, from other sources, banking sources in Europe and here, as well as from those who actively participated, the Middle Eastern banking activities, that the Arabs have not been buying any substantial amounts of gold since last summer. Before there was a concept, or at least an accepted concept that gold on the free market was purchased by the French, by France in general; by Middle Eastern oil sheiks; and of course a large quantity goes into the sub-Indian continent.

But I was rather surprised to hear transactions in the gold market, legal market, there was not any active participation by the Arabs now that they have excess of money. So they are either considering producing oil in order to have a direct investment at some point or other; or they will opt to retain the oil in the ground, rather than just exchange it for gold and then keep it. That's just a theory.

Mr. REES. Any comments?

Dr. RUSSELL. Not from me.

Dr. BOHL. No.

Mr. REES. Congressman Crane is our gold expert in this committee. Are there any other questions?

If not, I want to thank you very much for an excellent study, and we really do appreciate your contribution to the work being done by the ad hoc committee. The meeting is adjourned.

[Whereupon, at 11 :50 a.m., the meeting of the ad hoc committee was adjourned, subject to the call of the Chair.]

