ENERGY TAX ACT OF 1977

HEARINGS

BEFORE THE

COMMITTEE ON FINANCE
UNITED STATES SENATE

NINETY-FIFTH CONGRESS

FIRST SESSION

ON

TITLE II of H.R. 8444

THE ENERGY TAX ACT OF 1977

AUGUST 8, 9, 10, 11, AND 12,
SEPTEMBER 8, 9, 12, 13, 14, AND 15, 1977

PART 5 OF 5 PARTS

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SEPTEMBER 15, 1977
AND
COMMUNICATIONS

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ENERGY TAX ACT OF 1977

THURSDAY, SEPTEMBER 15, 1977

U.S. SENATE,
COMMITTEE ON FINANCE,
Washington, D.C.

The committee met, pursuant to notice, at 10 a.m. in room 2221, Dirksen Senate Office Building, Hon. Russell B. Long (chairman of the committee) presiding.

Present: Senators Long, Talmadge, Byrd, Jr., of Virginia, Gravel, Bentsen, Matsunaga, Moynihan, Curtis, Hansen, Dole, and Packwood.

Senator TALMADGE. The committee will please come to order.

Chairman Long asked me to inform you, Mr. Secretary, that he would be delayed for a few minutes and asked me to preside, pending his arrival.

Do you have any additional statement that you want to make at this time, or are you prepared to try to respond to questions?

STATEMENT OF HON. JAMES R. SCHLESINGER, SECRETARY, U.S. DEPARTMENT OF ENERGY

Secretary SCHLESINGER. Mr. Chairman, I will take a moment or two to review where we stand.

The emphasis of the program has been to make maximum use of the price mechanisms that provide the incentives and the disincentives for a shift toward more abundant fuels and some incentive for additional conservation.

Through the use of the price mechanism we can leave the great bulk of decisionmaking to corporations and individuals and avoid the direct involvement of the Federal Government in those decisions that are more appropriately made in the private sector.

I would like to place great stress on the use of the price mechanism. I think it is the most effective way to bring about the adjustment of America's capital stock as we face the transition in the use of our fuels over the course of the next 30 years and, in particular, as we face the stringency in the availability of petroleum which will come about worldwide in the 1980's.

We now have time to make adjustments in our capital equipment. Let us make use of that time.

Thank you, Mr. Chairman.

Senator TALMADGE. Thank you very much, Mr. Secretary.

Senator Dole?

I would suggest, if it is agreeable to members of the committee, that we restrict ourselves to 10 minutes each on the first round. Is there any objection?

Senator DOLE. Mr. Secretary, first, I congratulate you for your new responsibilities and wish you success and certainly want to pledge my support where I can be helpful.

I was not here when you appeared before the committee in early August, but there were members here, Senator Packwood, Senator Talmadge, and others. I have had a chance to review that testimony. I have been here every day since we have been back from the recess and I have yet to find or hear a single witness in support of the equalization tax or the IUT.

That, in itself, does not say a great deal except we are talking about such diverse groups as the Consumers Federation of America, the AFL-CIO, the chamber of commerce, industry, and many other witnesses.

I said a couple of days ago that, based on that array of opposition, it seems doubtful to me that we either could or should pass the legislation recommended by the administration.

Are all of these people wrong and the administration right?

Secretary SCHLESINGER. Senator, I do not think it is news to the Members of Congress that taxes are not popular. The purpose of the tax measures that we have proposed is to bring about the transition to greater use of alternative fuels and to greater conservation.

Since the 1973 embargo and the quadrupling of world oil prices, we have been subsidizing each barrel of oil that comes into the country. The subsidization of imports is not the road to reduce energy dependency.

We must, I think, recognize what the replacement costs are of oil and charge consumers the cost of that replacement.

In addition, I believe that you, in particular, and your colleagues, in general, will welcome the uniform price for refineries so we can dismantle the entitlements program and the Federal bureaucracy that administers that program. It is necessary to get oil prices up to reflect world costs.

It is also, I think, necessary to avoid inventory profits.

Now, the groups that have testified agree only on the desirability of avoiding this tax. The underlying premises are quite different.

Consumers would like to avoid all price increases. Industry that has testified against the wellhead tax likes the price increases but would like the receipts to flow to industry.

Given the sixfold increase in world oil prices since the early 1970's, that would result in enormous inventory profits, or windfall profits, vastly in excess of the pending spending plans for investment in oil and gas production by the industry.

So we come to a necessary compromise. If we are to avoid subsidizing imports and, at the same time, for reasons of equity, avoid a runup in inventory profits not related to an economic function, the wellhead tax is a way of achieving it.

I think that you will find, however, that there are many people in industry who will support the wellhead tax. Indeed, members of the oil industry see it as a preferable way of bringing about adjustments. They would prefer a plowback, but they recognize the need for the wellhead tax.

Senator DOLE. Let me be more specific. I am certain that others will cover the same area, but let's just go to the users tax first. There have been a number of witnesses, as you are aware, who have been severely critical of the industrial users tax. I am not certain if the purpose of the tax is to penalize the use of oil and gas or to provide incentives to switch to coal.

I think I know what the stated purpose is. However, a witness yesterday, Mr. McCollam of the National Electric Reliability Council, said there were no new base-load oil-fired plants on order, that coal is already the economic choice for new plants and they are switching as fast as possible.

The users tax will not cause conversion to coal to occur more rapidly. It appears, based on your testimony that it is a penalty and not an incentive or an effort to promote conversion.

Do you have any quarrel with the witness we heard yesterday? There are a number of others whose testimony was similar to Mr. McCollam yesterday.

Secretary SCHLESINGER. The question goes to the heart of the issue, Senator.

In the first place, this is designed as a carrot and stick approach. It is designed to raise revenues which can be reallocated to the industry as it converts. It is not intended to be a penalty or to be punitive. It is intended to be an inducement to the move over to coal.

Senator DOLE. They gave us a chart—I think Senator Packwood may have it. What does it show there?

Senator PACKWOOD. They have no new oil- or gas-fired furnaces scheduled for production after 1984.

Secretary SCHLESINGER. That is correct, Indeed, the administration's program would preclude the construction of new oil- and gas-fired plants. However, we have to deal with the issue of existing capacity, and that is what the oil and gas users tax is intended to do; with a few exceptions, that tax would be rebated to companies as they made the conversions.

There are some utilities that would be unable to make use of the rebates and the House provisions permits an exemption in the event that a utility has done all they reasonably can do, to move over to alternative fuels.

We are also prepared, Senator, to go to a more gradually phased-in tax for the utility sector, but your questions were directed towards the industrial sector.

Senator DOLE. Let me add that it really would not damage the program too much if we just killed that tax, would it?

Secretary SCHLESINGER. I was about to add, Senator, that we can probably deal with much of the utility problem in the absence of that tax. Your question went to the utilities; it did not go to industry.

I think that tax is indispensable in providing the correct criteria, the correct signals, for industry to begin to adjust away from oil and gas. If we cease to make better use of our oil and gas, of our oil in particular, we will have to hem in the American transportation sector, which, unlike stationary sources, cannot switch to coal. Industry should be so encouraged.

Senator DOLE. We also have testimony from the same witness that the tax is damaging consumers of electricity. Mr. McCollam was estimating, as far as the State of Louisiana was concerned, it would increase, on a per annum basis, per family, about $200 a year if we adopt the users tax as proposed by the administration.

We are talking about a $1 billion increase for consumers in one State—$1 billion.

Secretary SCHLESINGER. As I indicated a moment ago, the effects of this tax on utilities will be varied. We have done some individual studies of utilities and a number of them would have difficulty making use of the rebates to shift over to coal.

One is Southern California Edison; another happens to be the Middle South system. They would be unable to make complete use of these rebates because their gas-fired capacity is of more recent origin.

The House provision, as I mentioned, permits the exemption of such utilities if, indeed, they have made a good faith attempt to go over to coal or other nonoil and gas facilities, but are unable to proceed further. The Middle South situation and the Southern California situation are rather rare.

Senator DOLE. I hope to come back to that on the next round.

You indicated the fact that we do away with the entitlements program. Do you have something else in mind to protect the small refiners, either refund or tax credit?

Secretary SCHLESINGER. We have agreed with the House that during the course of the 3 years in which the wellhead tax is being imposed and you are achieving uniformity of costs for the refiners, that we would study the matter.

Senator Long suggested the other day that we go to a 2-year imposition of the wellhead tax rather than 3 years, but we would still have ample opportunity to study the issue of the premium for the small refiner with the Congress.

Senator DOLE. Just to follow up on that question, what good does the study do—what does the refiner do in the interim?

Secretary SCHLESINGER. In the interim, there is no problem because he would not be faced with uniform taxes until the wellhead tax is completely imposed, which would be 3 years out in the administration's original proposal or 2 years if Senator Long's suggestion were adopted.

In either case, we would have ample time to deal with that small refinery bias.

Senator DOLE. Thank you.

The CHAIRMAN. Senator Packwood.

Senator PACKWOOD. Mr. Secretary, one, as far as electric utilities are concerned, do I understand you to say that the user tax is probably not overwhelmingly significant in terms of forcing the conversion to coal?

Secretary SCHLESINGER. I think that is correct. We have mandatory measures of the sort that Senator Dole referred to. In addition, the effect of the tax will be far greater in the case of industry and industrial conversion that it would be in the case of utilities.

The tax would be helpful in most cases in moving oil- and gas-firing capacities to a peaking status, in which case it is exempt from the tax, and away from the status of base-loaded plants.

Senator PACKWOOD. But on priorities, the utilities occupy a lower place on the spectrum than other industrial users?

Secretary SCHLESINGER. Yes, sir.

Senator PACKWOOD. All right.

Two, the equalization tax, you indicated that the principal purpose is to get the price to the world price because the consumers are going to have to pay for the cost of oil at the world price.

Secretary SCHLESINGER. And to eliminate subsidies, and to eliminate the entitlements program.

Senator PACKWOOD. I understand that. But the point of the equalization tax is principally to get it up to the world price?

Secretary SCHLESINGER. Yes, I would say so. But I would not want to understate the significance of getting rid of the entitlements program.

Senator PACKWOOD. No. I'm with you; a serious burden. But certainly the crude oil equalization tax is not a tax designed solely for the purpose of the tax, for the fun of collecting revenue?

Secretary SCHLESINGER. Absolutely not. We have proposed that it be rebated. There are differences in views on that.

Senator PACKWOOD. Now, if this committee could find another way to get oil at the world price, without the equalization tax, we would have at least accomplished the first goal that you are trying to achieve, which is to get oil to the world price.

Secretary SCHLESINGER. Yes, sir, you could. The easy way is just to let the prices run free. And the consequences of that would be what I outlined in my initial statement. There would be some questions about equity and the distribution of income.

Senator PACKWOOD. But then, if this committee could find some equitable way of making sure that those profits were put to a usefully social purpose, that would be amenable to the administration?

Secretary SCHLESINGER. I think that that would certainly alleviate our concern.

Senator PACKWOOD. So we are not really hung up on the equalization tax if we can achieve the same end by some other purpose?

Secretary SCHLESINGER. We have surveyed all the alternatives, and it is our recommendation that the equalization tax is the most preferred of those alternatives. And we underscore that, at the present time, the cash flow for the oil industry vastly exceeds the amount of funds planned to be invested in exploration and development.

Senator PACKWOOD. Somebody said they are awash in liquidity.

Secretary SCHLESINGER. No, they are not awash in liquidity.

Senator PACKWOOD. What was the statement?

Secretary SCHLESINGER. I believe that we have indicated that there is a cash flow from exploration and development vastly in excess of the spending plan of the oil and gas industry for exploration and development. Part of this is due to the lack of opportunity for the industry because the OCS leasing schedule does not permit a rapid investment of that cash in exploration and development.

Senator PACKWOOD. Let me ask you another question about the U.S. Geological Survey finding and some other findings on the availability of oil, crude oil.

I think we are now agreed, before I get to the crude oil part, that indeed this country is not energy-short in the long run. We have ample

resources in the form of shale or coal or a variety of other energy sources to take care of our long term——

Secretary SCHLESINGER. Energy resources.

Senator PACKWOOD. Energy resources, yes. Maybe even oil resources. I am not sure, but maybe not crude oil.

But I am intrigued—I asked about the statement of Barry Commoner's the last time you were here about we have enough crude oil in this country, crude oil, to take care of our needs from 44 to 68 years. To which you did not quite say he is smoking pot, but words to that effect.

Secretary SCHLESINGER. Well, let me go over that.

In the first place, with regard to the total energy resources, if by the long run you mean several hundred years, indeed, that is correct. If you mean for 500 years, it is not so.

With regard to oil, president reserves are something in excess of 30 billion barrels. The Geological Survey says there is another 80 billion barrels to be found and recovered with a 50–50 probability.

Senator PACKWOOD. Wait a minute, USGS says what?

Secretary SCHLESINGER. 80 billion.

Senator PACKWOOD. Are these what you were calling economic but undiscovered in a range of 50 to 127?

Secretary SCHLESINGER. I think that is the case.

Senator PACKWOOD. OK.

Secretary SCHLESINGER. If you talk to people in the oil industry, they say that we will discover as much oil in the future in the United States as has been discovered up to this point, about 130 billion barrels. That reflects, perhaps, some industry optimism.

But if you take present reserves and add on 130 billion barrels, at our present rate of use in the United States, we could exhaust all of that oil in 24 years. We would not exhaust it because that requirement would be alleviated by imports. That is at our present rate of use.

Senator PACKWOOD. You are not counting the additional 120 billion to 140 billion barrels of identified reserves that USGS calls subeconomic. It is there; it can be produced. It is crude oil, but at the moment, the price is not sufficient to bring it out.

Secretary SCHLESINGER. If you wish to add that to the tables, that would be fine. That would be what? 200 billion barrels?

Senator PACKWOOD. If you want to take it on the low side, it is 170, on the low side to 267 on the high side.

Secretary SCHLESINGER. At our present rate of consumption, then, that oil would last something on the order of 28 to 30 years.

Now, the important point is, we cannot accommodate any increase in oil consumption. We ought not to permit the capital stock of this country to become more oil dependent. We are not going to run out of oil immediately. However, if we start to make our conversion over the next 5, 10, 15, or 20 years to coal, solar, geothermal, and nuclear, we will indeed have enough oil to get us through those next 10 to 15 years, if we can find it and recover it and produce it.

The problem that we have is the producability. The national energy plan contemplates continued use of oil resources from overseas, which are readily available, in order to stretch out our domestic supplies, without going to the point of making this country unduly vulnerable to the threat of interruption.

Senator PACKWOOD. Let me ask you a question, if you know. I was struck by Press Secretary's attack on Senator Percy yesterday. I am curious if the reason that Dr. McKelvey was fired as head of the U.S. Geological Survey was because of his very optimistic projections on the amount of oil that is available for discovery in this country.

Secretary SCHLESINGER. I have no notion as to why Dr. McKelvey was fired; you will have to ask Secretary Andrus that question.

Senator PACKWOOD. The answer that Secretary Andrus gives is that they want somebody who is more amenable to the administration's position, whatever that means.

Secretary SCHLESINGER. You would have to inquire further.

Let me reiterate: Under any circumstances, the world is going to run into oil stringency in the 1980's unless we change the pattern of growth of demand. That will not be avoided by alterations of policy in the United States. It will not be altered to any significant extent, because of the surge of demand worldwide, and other nations have far less a degree of alternatives available than does the United States.

That is a set of circumstances that we will be facing within 8 to 10 years. If you survey what the major oil companies have said over the years—indeed, in recent months—you will discover that they all agree that the world will peak out in terms of oil production around 1990.

That is not a judgment of the Government. That is a judgment that is made by all of those in the industry. It is one of the reasons that the industry, quite naturally, would like to shift into alternatives—coal, uranium—in order to absorb that cash flow.

But there is no question that we are going to be oil-limited worldwide. We are presently oil-limited in the United States, as reflected in an oil-import bill of $45 billion a year at present prices and 8½ million barrels a day of import.

Senator PACKWOOD. Question, then. You indicate that most of the major industrial nations of the world are more dependent upon oil than we are, imported oil?

Secretary SCHLESINGER. And most of them are more dependent on oil itself, sir.

Senator PACKWOOD. Correct.

Why, if we do nothing more than allow oil to float to the world price, which I assume will float upwards over the years, will we not automatically convert to other sources of energy in the country that are cheaper than oil?

Secretary SCHLESINGER. It will not be done automatically, but it is a powerful incentive. That is a principal reason why the administration proposes moving to world oil prices. That would be something on the order of a 40 to 50 percent increase over the present average price in the United States.

And, depending upon the elasticity of demand in various ranges, you would have a powerful inducement to go over to coal.

Senator PACKWOOD. Thank you.

The CHAIRMAN. Senator Byrd?

Senator BYRD. Thank you, Mr. Chairman.

Mr. Secretary, because of my high regard for you, I start out with a favorable reaction to a proposal that you send to the Congress, just from the fact that you are associated with it.

Now, this proposal——

Secretary SCHLESINGER. This will be no exception, I am sure.

Senator BYRD. There always, I suppose, have to be exceptions, and I think this falls in that category.

Now, this proposal would place upon the American people a huge tax increase. The Wall Street Journal calculates that it will be the largest peacetime tax increase in the Nation's history. I think that is very serious. I do not believe that this is a time to be putting the highest peacetime tax increase on the American people.

What incentives are there in this program to create an additional supply of energy for the American people?

Secretary SCHLESINGER. The first comment, Senator, with regard to the largest tax increase, the administration's proposal would result in the rebating of all of those taxes, save an estimated $5 billion.

Senator BYRD. Am I correct in understanding that, over the period 1978 to 1985, there will be an increase in taxes to the American people of more than $96 billion, or an average of $14 billion per year?

Secretary SCHLESINGER. That is approximately in the right ballpark, Senator, It would be a little higher; we would estimate about $120 billion.

Senator BYRD. A little higher than $96 billion?

Secretary SCHLESINGER. Yes, sir.

The estimates have ranged all over the place. They have gone as high as $346 billion according to the chamber of commerce estimates.

Senator BYRD. What is your estimate?

Secretary SCHLESINGER. If you leave out the gasoline tax and take into account the House adjustments, it is approximately $125 billion between now and 1985, of which $120 billion would be rebated, if you follow the administration's proposal, for a net tax of approximately $5 billion.

Senator BYRD. Well, I have then underestimated the total taxes that would be taken. Your estimate is $125 billion?

Secretary SCHLESINGER. Senator, I wanted to strengthen your argument.

Senator BYRD. You have.

Secretary SCHLESINGER. That was my intent.

Senator BYRD. That is $125 billion, not counting the additional taxes that would be taken if your gasoline tax is approved?

Secretary SCHLESINGER. Yes, sir.

Senator BYRD. Do you still recommend that gasoline tax?

Secretary SCHLESINGER. We have recommended that to this committee.

Senator BYRD. And how much should that be?

Secretary SCHLESINGER. That depends on the success of the American people in responding to the targets that would be set out for the consumption of gasoline. If the tax is triggered in any particular year, it would amount to $6 billion per nickel of tax.

Senator BYRD. Do you seriously feel that an increase of 5 cents per year in the gasoline tax will cause an appreciable reduction in the use of gasoline?

Secretary SCHLESINGER. The impact of the tax itself, the economic effects, the price effects, given the low elasticity of demand, will not

have an appreciable effect. What we believe will happen is that the challenge of going over those targets will bring out the capacity of the American people to save gasoline and it will become a national mission, and in that way the tax, in its broadest psychological sense, will have the effects that will be appreciable.

Senator BYRD. Now, you propose, if this program is enacted, to take from the American people $125 billion, but then you would give back to Americans all but $5 billion of the funds collected.

Secretary SCHLESINGER. The tax is divided into a number of components. The wellhead tax, aside from the rebate to the fuel user, would be divided in its entirety amongst American taxpayers.

Senator BYRD. How do you do that?

Secretary SCHLESINGER. Through the tax system.

Senator BYRD. Somewhat like the $50 rebate that was going to be given to people last spring?

Secretary SCHLESINGER. It is comparable to the credits which are already in the income tax system which we pay each year.

The oil and gas users tax would be rebated to firms as they made investments which permitted them to use coal in place of oil and gas. The estimate is that all but $5 billion of that tax would be utilized by those concerns and would be rebated.

Senator BYRD. Now, you say it is important to rely on the price mechanism?

Secretary SCHLESINGER. Yes, sir.

Senator BYRD. Well, if that is the case, would it be logical to phase out the controls on petroleum products?

Secretary SCHLESINGER. No; because the price mechanism, in that case, reflects an administered price established worldwide by the cartel; between 1970–71 and today, world oil prices were increased sixfold by the decisions of the cartel under circumstances in which supply and potential supply exceeded demand.

Senator BYRD. But the administration's program proposes to raise the price to the cartel price.

Secretary SCHLESINGER. That is correct, because we must recognize reality. When we are importing almost half of our oil, as we are today, the actions of the United States are not going to be effective in adjusting that world oil price. We are not King Canute, and we cannot demand the waves of the sea to stand still.

What we have done in the United States is to subsidize each barrel of oil that comes into this country and, as I suggested to Senator Dole, that is not the road to reduce energy or oil dependency.

Senator BYRD. Now, to get back to the rebates for a moment, to whom are the rebates to go?

Secretary SCHLESINGER. It would go to taxpayers through the tax system. There would be an annual tax that rises—the annual rebate on a per capita basis would be approximately $28 and that would be a direct tax credit.

Senator BYRD. So you are going to distribute the $28 to everybody all over the United States?

Secretary SCHLESINGER. Yes, sir.

Senator BYRD. Regardless of how much they paid in taxes, how much they did not pay in taxes, and so forth?

Secretary SCHLESINGER. That is correct.

Senator BYRD. I think it was Senator Long who described that $50 tax rebate as like throwing dollar bills out of an airplane. Would this not be roughly in that same category?

Secretary SCHLESINGER. The tax is designed to bring about equalization of crude oil prices between the United States and the world oil supply. It is intended to bring equalization of crude oil prices facing the refineries so we can get rid of the entitlements program, and Senator Byrd, reduce Federal employment in that way.

Senator BYRD. Well, that was going to be my next question——

Secretary SCHLESINGER. And that will provide the funds that will have to be recycled in the manner that we have indicated.

Now, the House has agreed to a rebate for 1 year, but I think in the back of the House's mind, they would like to use this as a general source of tax reform money. There have been alternative suggestions from this committee with regard to the use of that money.

Senator BYRD. That gets me to my next question.

Did you mention in your testimony that this measure would dismantle the Federal bureaucracy?

Secretary SCHLESINGER. That that administers the entitlements program, yes, sir.

Senator BYRD. In another part of your statement, you said that the Government should use this new program as a carrot and a stick—so I assume that that means that there must be a bureaucracy to accomplish that.

Secretary SCHLESINGER. Not for the wellhead tax, sir. The reference to the carrot and the stick is the opportunity for any firm that pays taxes on the use of oil and gas to obtain all of that flowback to convert to coal or to other abundant fuel. And that, of course, would require that the Treasury Department handle those flows of funds, but I think that the requirements in addition to the ordinary manpower requirements of the IRS would be minimal. I do not have the numbers available.

Senator BYRD. Thank you, sir. My time has expired.

The CHAIRMAN. Mr. Talmadge?

Senator TALMADGE. Thank you, Mr. Chairman.

Mr. Secretary, it seems to me that the weakness of the House-passed bill is that it does not anticipate trying to develop alternative sources of energy with the same resolve that we have in past years.

I agree with the President. I think that energy is the most complex problem facing our country. I think we have got to tackle it with the same resolve that we did in World War II when we developed that synthetic rubber; the same resolve that we did in World War II when we developed the atomic bomb; and with the same resolve that we had when we put a man on the Moon in 1970.

I see nothing in the House-passed bill which will proceed with that determined resolve.

For instance, when you were before our committee during the August recess, your estimate, I believe, was that we could produce petroleum from shale rock at $18 to $20 a barrel.

Secretary SCHLESINGER. That is the industry's estimate.

Senator TALMADGE. You stated also that Occidental Petroleum had estimated that they could produce it for $12 a barrel.

The following day, Secretary Blumenthal was before our committee and he stated we are presently importing about $42 billion worth of petroleum annually. It probably could go to $45 billion before the end of the year and our deficits on our balance of payments would be something on the order of $25 billion, or perhaps even greater.

My next question is this. With all this shale rock that we have out in the Rocky Mountains, what does the House-passed bill do to develop that?

Secretary SCHLESINGER. The House-passed bill provides the certainty of receiving the world oil price for that oil as opposed to the domestic oil price as is the present policy. That is all that it does.

Whether that is a price sufficient to elicit supply remains a question. If you accept Occidental's estimate, it would. If you accept most of the estimates within the industry, it would not.

Senator TALMADGE. Using your own cost figures now of $18 a barrel, what does it cost per barrel of imported energy from OPEC now?

Secretary SCHLESINGER. Approximately $14.40 a barrel.

Senator TALMADGE. $14.40. All right. If you used the subsidy of $3.60 a barrel for the production of shale rock, you would have that equivalent to the domestic energy produced.

Now, we are importing now, what? Seven million barrels of petroleum a year?

Secretary SCHLESINGER. It is 8.5, sir.

Senator TALMADGE. 8.5. To use a rough estimate, you could use a subsidy of $15 billion a year to produce shale rock energy to save imported energy at $5 billion a year, could you not?

Secretary SCHLESINGER. Ultimately we could raise production to that level; not immediately.

Senator TALMADGE. Why do we not proceed in that direction to develop our alternative sources as quickly as possible?

Now, Atlantic Richfield testified this week, and they say that they can produce economically shale rock petroleum with a tax credit of $3 a barrel. Now, why should they not do that? If they do not produce the petroleum, they would not get any tax credit?

Secretary SCHLESINGER. I would hesitate to say, Senator, that we should not do that. I think that that is a useful option. I think that we should indeed explore that option, and I will discuss with the President to see whether the administration would agree to endorse that kind of proposal.

Senator TALMADGE. Secretary Blumenthal followed you the following day. I threw out that alternative to him and he suggested that if we could subsidize shale rock at $12 to $14 billion a year and get energy-sufficient, that it made a lot more sense than paying $45 billion a year for imported energy.

If we could do that, we could break the OPEC cartel and we would become self-sufficient in energy. We would have the jobs in the United States of America, rather than OPEC.

Would that not make sense?

Secretary SCHLESINGER. It is very attractive, Senator. I reiterate, though, it will take some time to get production up.

Senator TALMADGE. I agree with that, and the industry spokesmen also agree with that. But we have lost 4 years already by talking about it, instead of doing nothing about it.

It seems to me that if we could make it attractive to the domestic industry to go out there and start producing shale rock, they say there is 1.7 billion barrels potentially out there. Is that probably correct?

Secretary SCHLESINGER. Yes, sir. Some of the deposits are marginal, though.

Senator TALMADGE. Now, some other things have developed in these hearings. We had a witness yesterday, a very effective spokesman. I believe Senator Dole quoted him a time or two. He stated that it takes some 14 years to build a nuclear plant in the United States.

When are we going to stop that foolishness and get on with building them?

Secretary SCHLESINGER. Soon, Senator.

Senator TALMADGE. I am perfectly willing to give you the authority to make the decision overnight, but someone needs to have the power to act. Do you share that view?

Secretary SCHLESINGER. Senator, I might be willing to endorse that, but I do not think we could get universal agreement on it.

The administration will send to the Hill shortly a nuclear licensing reform act that is intended to reduce the period of construction and licensing down to approximately 7 years.

Senator TALMADGE. That would be longer than it takes in Japan and Germany right now, would it not?

Secretary SCHLESINGER. Perhaps a shade longer. The Japanese leadtime has been creeping up, too.

Senator TALMADGE. What is the Japanese leadtime?

Secretary SCHLESINGER. I think it is now 5½ or 6 years, sir.

Senator TALMADGE. It seems to me that we have got to do something about cutting redtape just like the War Production Board did in World War II.

Secretary SCHLESINGER. I wholeheartedly agree.

Senator TALMADGE. As far as I am concerned, I am perfectly willing to give you that authority, but someone needs to act, someone needs to have the power to make decisions and make them stick.

Now, what in the House bill will proceed to develop these huge methane deposits we hear about in the Gulf of Mexico and Louisiana and Texas? They say it is sufficient to last this country for 200 years.

Secretary SCHLESINGER. There is nothing in the House bill other than the prices for natural gas and our legislation for the Department of Energy that will permit us to deregulate, and we intend to deregulate, all such exotic sources of natural gas.

That would permit a price of perhaps $3.50, $4, depending on what the market would bear.

But the main thrust at the moment is ERDA's development program. ERDA has now sunk 11 wells. In ERDA, we are working on the technology to develop that capacity, and I share your hope that we will be successful.

Senator TALMADGE. Would it not be advisable to use some of this enormous revenue, or tax credit, or subsidy, or whatever it takes to develop some of those deposits?

Secretary SCHLESINGER. The problem is the development of the technology. We can review that program and see whether we could use additional funds for the development of that technology and we shall be back to your office, Senator, with an evaluation.

Senator TALMADGE. We had some witnesses who testified about oil refineries. They say if they do not get their bias, that they are going out of business.

Could you respond to that?

Secretary SCHLESINGER. They are quite right that what keeps the small refinery in business is the bias, because those refineries are uneconomic and cannot stand unfettered competition. As I responded, I think, to Senator Dole, we have 3 years, or 2 if the chairman's preference were to be followed, before the uniformity of price would apply to refineries. We have agreed with the House that we will study the matter and present alternative options to the Congress regarding what the Congress could do in the longer run regarding that bias, and the preference or protection of small refineries. We do not have to act now.

Senator TALMADGE. Should we keep them in business, or let them die?

Secretary SCHLESINGER. I would prefer to withhold comment on that question, Senator.

Senator TALMADGE. Now, what are we paying for natural gas that we import from Canada?

Secretary SCHLESINGER. We are prospectively going to pay $2.16 per million cubic feet.

Senator TALMADGE. $2.16. What are we paying for gas that we expect to get from Mexico over this new pipeline?

Secretary SCHLESINGER. That will be a matter of negotiation between the companies, the Government of Mexico and the Federal Power Commission or its successor.

Senator TALMADGE. What is your best guess?

Secretary SCHLESINGER. I would not think that we would be prepared to go above the price that we give to the Canadians, which is $2.16.

Senator TALMADGE. What are we paying for liquified gas we import from Algeria?

Secretary SCHLESINGER. The price is something on the order of $4 per million cubic feet.

Senator TALMADGE. $4.

Secretary SCHLESINGER. And that deserves a good, hard look, as you indicate.

Senator TALMADGE. Why should we keep domestic prices below what we are paying for imported gas?

Secretary SCHLESINGER. I think that there are two answers to that. First, that these high-cost sources overseas should be scrutinized, including LNG's, because it may be too high a cost of energy.

Second, with regard to the domestic price, what we are attempting to do is to give a very good incentive price for the production of gas which, we trust, will bring about expanded production in the United States.

The intrastate price, on average, in June for example, was $1.74. The cap is designed to avoid the severe price fluctuations of the sort that we had last winter. But we have established what we think to be a good incentive price at which producers can make substantial returns for the shallow deposits. We intend to deregulate deeper deposits, tight formations, and the like.

Senator TALMADGE. Mr. Chairman, I ask unanimous consent to ask one additional question. When are we going to start drilling in the Atlantic?

Secretary SCHLESINGER. Given the removal of the legal barriers, I believe that the companies will move rapidly to start drilling in Baltimore Canyon and that should be within a matter of 5 or 6 months.

Senator TALMADGE. Thank you, Mr. Chairman.

Thank you, Mr. Secretary.

The CHAIRMAN. Let me see if I understand that answer. You qualify your answer by saying, "given the removal of legal barriers." Is that an iffy answer, or do you mean we are going to start drilling in 5 or 6 months?

Secretary SCHLESINGER. I was referring to the fact that the court of appeals overruled the district court and that the companies are now free to go ahead.

The CHAIRMAN. But, of course, you suppose that those who are trying to hold up the drilling will not take it to the Supreme Court, is that right? Or can that be expected?

Secretary SCHLESINGER. I fear that you may be correct, sir.

The CHAIRMAN. So that is an iffy answer, then?

Secretary SCHLESINGER. The legal process, Mr. Chairman, is an iffy process.

The CHAIRMAN. Senator Moynihan is our next early bird on the list.

Senator MOYNIHAN. Thank you, Mr. Chairman. I do not want to take much of the Secretary's time. It is a personal pleasure for me to greet him as Secretary. We have been through many things together.

I am very much in support of the bill you put together, Mr. Secretary, that the President has sent to us, and yet I would like to just make one general comment and then ask two specific matters about something which I know troubles you. It is a concern that I think has animated the structure and explains what you have proposed to us, and that is the concern for the enormous growth of the power of Government, which is a condition of our time, and I think clearly your effort to bring about an energy program through taxes than through the regulatory mechanism is clearly designed to minimize that impact.

I have been troubled by the imagery of war, even the moral equivalent of it, and you know that our Constitution was framed by people who were very much sensitive and alive to the abuses of power. But we have had very little experience with the equal definition of government that comes with the growth of power. And in the experience of modern man, nothing has brought greater interest in the power of government than war and potentially the moral equivalent of war.

This has been forced on us by government outside as a homogenous effect, you could say, in the state capitals of Saudi Arabia, Venezuela, and Iran. Gasoline sold by volume in this country for the price of bottled water, and Government had nothing to do with the price. Now that the Government has a lot to do with the price, it will never sell at the price of bottled water again.

I think that you have been right to pursue tax strategies, the minimum amount of regulation. Let the people calculate their own interests and respond.

It is a very complex tax system; an alternative to a noncomplex tax system is an insidiously complex regulatory system. You, no doubt, read the Washington Post editorial this morning. The lead editorial, called "Cars and the Puritan Spirit," observes that the Senate—let me be the first to state that I voted with everybody else——

Senator DOLE. Not with everybody else.

Senator MOYNIHAN [continuing]. In determining to regulate the mileage of automobiles and did not know what a car is.

The Senate's passion for a flat prohibition with respect to mileage is going to push the Government into a new and unexplored depth of the regulatory jungle in return for only the most trivial benefits. I will not ask you to agree with that, but you do not seem to disagree?

Secretary SCHLESINGER. Our proposal was for a tax.

Senator MOYNIHAN. We have not said what a car is, but we told you how many miles a gallon it can get. We very carefully avoided mentioning air-conditioning, a regional sensitivity that I do not wish to raise. Can you imagine the Bureau, if they are going to decide what a car is and how many miles of gas, and whether it has to get 5 years after it comes off the line? Do not imagine; you have difficulties enough.

I want to ask you on one point, in seriousness, at that point where your strategy of taxation interfaces with regulations, and that has to do with the user tax that you have proposed. It is a complexity of three tiers of distinguishing between processes in manufacturing in powerplants, and it is going to have to be arbitrary. But, Mr. Secretary, a great many people have come to us in New York State—the Kodak Co., which is one of the finest companies we have. It is a good a citizen, a sane citizen, a profitable one. They even sell their film in Japan. And our utilities, and other people, said, "Look, you have built a tax in here where we either pay or convert to coal, and if we convert to coal, the Committee on Public Works puts us out of business, specifically the Environmental Protection Agency puts us out of business."

The Government has put them in an awful dilemma. The State of New York, as far as taxes, we were in that happy condition, we thought we were doing pretty well. It turns out, after two centuries of striving, we have become a permanent nonattainment area.

What Alexander Hamilton hoped for came to pass and turned out to be nonattainable.

What are we going to do about one Federal regulation which says you must convert to coal and another regulation that you can't convert to coal?

Is there some way we could ask you to respond in terms of changing the behavior of EPA?

Secretary SCHLESINGER. I think by changing the rules by which EPA operates is a question for the Congress and not a question for the Department of Energy.

Senator MOYNIHAN. It is a question for the administration that sends us—that requires two things of us.

Secretary SCHLESINGER. The legislation that emerged from the House provides an exemption from the tax if, indeed, it is a true nonattainment area. In addition, in our calculations on the degree of coal conversion, those parts of the country that could not convert to coal are

excluded, and consequently, that gives us our estimate for coal conversion.

Part of the complexity of the proposal that emerged from the House for a three-tiered system to which you referred, Senator, comes from an attempt to deal with these local complexities. Our original proposal was a uniform tax that was simple to administer and simple to understand, although in some cases it would be painful to pay.

Senator MOYNIHAN. Would you be in favor of an exemption in areas where the EPA standards were such that coal conversion was not possible?

Secretary SCHLESINGER. We have gone along with that in the House proposal.

Senator MOYNIHAN. If we included that in a set-aside?

Secretary SCHLESINGER. We would find it acceptable.

Senator MOYNIHAN. Thank you very much, Mr. Secretary.

The CHAIRMAN. Senator Hansen?

Senator HANSEN. Mr. Secretary, it is an awfully difficult job to try to follow my good friend from New York because he has a way of saying things that just delights and pleases all of us, whether we agree or disagree with him. I find myself oftentimes in agreement with him.

May I say that I do not quite understand two assumptions that seem to have been made by the administration. Will you correct me if I am wrong?

Is it not the administration's contention that there is no point in permitting the price of new natural gas sold in this country in the short-term to exceed $1.75 a thousand for additional incentives? As I understand it, the administration contends that even if the price were to be pegged much higher than that, there would not be any corresponding increase in drilling or exploration efforts.

Am I right about that?

Secretary SCHLESINGER. Mostly right, Senator. We would not expect any significant increase in the short-run because of expanded activities from the shallow deposits. We plan to decontrol high-cost deposits, such as the tight formations in the West, with which you are familiar.

But for those shallow deposits, this is a very ample incentive and we would not expect a response in the near term.

As you know, the price in constant dollars will float upward with the Btu equivalent of domestic oil, so that price will be rising, and producers will be looking at higher prices in the future.

Senator HANSEN. I think that there is clearly some indication now, not only in the oil business, but in the stock market as well, that may deter potential investors in either oil properties or the stock market. They do not know but what we might pass a whole new set of laws and put retroactive dates, making them effective as we did last year in our joint operations with the House Ways and Means.

My feeling is, although I do not own a single share of stock, that that may be a factor, and I would suspect it has not escaped the attention of those in the oil business that they just are not sure what we will do.

Secretary SCHLESINGER. Senator, I am delighted to say that the performance of oil stocks is considerably better than the balance of the

market. I like to attribute that to the national energy plan, but I am not sure that all will join me there.

Senator HANSEN. Well, not every oil stock is sharing in the euphoric time of confidence that you refer to.

It seems to me that with intrastate gas prices reflecting what the market actually will support, it cannot be contended that $1.75 really is much of an inducement to the industry, because in many, many instances, the price that has been agreed upon between buyer and seller at the intrastate level has exceeded that. I have heard it contended that there is no need of having it go any higher because they are using all their rigs anyway.

The Hughes Tool Co. reported very recently that we have 2,350 rotary rigs in this country and only 2,150 of them are being used. The industry has a capability of manufacturing about 679 rigs per year. I think that you and I could agree that the one way to stimulate an activity is to create a demand for it.

Now, you may argue that some of these rigs are in transit and——

Secretary SCHLESINGER. Under repair.

Senator HANSEN [continuing]. And under repair, and I have heard that before, but I think that works both ways. I think, too, you cannot escape the fact that the industry does have the ability to produce upward of 700 rigs per year.

So I look upon this $1.75 figure really as, in some instances, a rollback. It is not going to be any great bonanza, and I think we need to do better than that if we expect the industry to respond as all of us hope that it might.

I started to speak about the crude oil equalization tax, and if my information is correct, it does not allow for any increase in old oil, except for inflation adjustments, under the Energy Policy and Conservation Act. Even under that act, the prices were frozen for more than a year, rolled back twice so that they are now lower than they were 2 years ago. Is that not a fact?

Secretary SCHLESINGER. That is not old oil, sir. It is upper tier oil. Indeed, the constant dollar value of a barrel of upper tier oil is lower than it was a year and a half ago, but not the constant dollar value of the barrel of old oil.

Senator HANSEN. Well, as I understand it, the effect of this policy has been to put an overall composite price into effect. The evidence I have before me indicates that at lower tier prices ($5.05), and upper tier price of $11.47, the system gets out of adjustment when you look at the volumes of oil.

The old oil volume is a declining one, and the new oil volume rises, so that if the old tier volume drops from 57 percent down to 53.5 percent and the upper tier volume increases from 43 percent to 46.5 percent, the composite price increase will have gone from $7.81 to $8.04 which is a 23 cents per barrel increase, but actually it has not resulted in any increase at all in the price of the old oil.

Is that not a fact?

Secretary SCHLESINGER. That is correct, Senator, and I agree with the thrust of your comments. It is the intention of the administration to submit legislation after the passage, we trust, of the National Energy

Act, to remove the composite from EPCA so that these adjustments of oil prices would not be impeded by the composite.

In addition, I think that there are some potential problems with old oil to assure that that oil does indeed get out of the ground. We are examining, as a result of the request of the House, going to a 35-barrel-a-day as opposed to the 10-barrel-a-day definition of "stripper wells," and therefore, those wells would be kept in production.

In addition, we recognize that for some of these older fields that the prices paid may no longer be sufficient to cover the costs and that adjustments would have to be made in those cases.

So the general thrust of your comment with regard to the possibility of an inhibition from the composite or old oil prices being too low to induce further production are matters of concern which we share with you and we will be taking steps on those.

Senator HANSEN. Well, I appreciate that.

In my State of Wyoming, we have had all kinds of problems. One has been that the EPA has been pretty active. When OSHA got its wings trimmed just a little bit, I suspect that the decline in public irritation that that agency was bringing about was made up in part by the increased activity of EPA. I would have to say that one of the problems that faces the oil companies out there is that despite the dryness of the region generally and the unlikelihood that any water that may be poured on any given point of land in Wyoming would get into a continuing flowing stream. Nevertheless, some of the secondary recovery efforts, and even some of the primary efforts result in the production of maybe as much as 9 or 10 barrels of water for each barrel of oil.

It used to be dumped out on the ground. It did not go anywhere because it was in dry country and it never reached a continuing flowing stream. But now, that water has to be taken off and processed and the consequence is that it adds greatly to the cost of the production of that oil. We can talk about changing the law, but unless something is done pretty quickly, I can tell you that the first day that it costs more to pump that oil and to treat that water than it does to produce it, they are going to stop doing it. They are not getting $5.05. I do not know what the most recent figure is, but a few months ago it was about $4.64 a barrel.

So here is a problem that I guess needs immediate recognition. It is not one that is going to wait for a law change, or it is just going to be too late. That is all.

Secretary SCHLESINGER. We will deal with one part of that problem ourselves, Senator. We are studying that adjustment for these wells that produce a substantial quantity of water, relatively speaking, or for a higher minimum for the stripper definition, and we have agreed with the House that we will be back shortly with some proposals in that area.

With regard to the EPA questions, I will discuss that with Mr. Costle, recognizing that handling this water in this fashion is going to add to the cost of the oil, reduce the potential benefits, and possibly put these wells out of production.

Senator HANSEN. Thank you, Mr. Secretary.

Senator TALMADGE. Senator Bentsen?

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

Like all who have gone before me, I attest to my admiration and high regard before I start differing.

Mr. Secretary, I am deeply concerned by the fact that I noticed the last 3 months' indicators of the Commerce Department on business have shown a decrease in the number of factory orders. In August they dropped by 3 percent, which is the highest drop since 1974.

I note unemployment has moved up, that interest rates have increased, that the stock market is down, that some of our economists are beginning to forecast a recession. I was further disturbed this morning to read that the Chairman of the Council of Economic Advisers had on his desk "The Crash of 1979."

At a time like that, we are talking about imposing the largest tax in the history—and I am particularly concerned about the use tax, because I do not believe it is going to accomplish the objectives. I think it is going to be exceedingly difficult to administer. It is going to result in a substantial increase in utility costs and rates to the homeowners, I know in the State I represent, and there was testimony yesterday that it would increase the cost of utilities to the average homeowner in Louisiana—and I am advised it would do the same thing in Texas—of on the order of $200 a year.

Now, in addition to that, 87 percent of the boiler fuel in Texas, generating electricity, is natural gas. That was not patriotic to do at the time they did it, and it was not the most efficient utilization at that time, but they have anticipated the problem and 2 years ago our local commission stopped new plants that were generating electricity by gas.

One of our utilities has advised me that by 1985, where they are now utilizing 87 percent of their electricity is being generated by the use of gas, by 1985, they will have it down to 40 percent, and that is the best they can do by 1985 regardless. All this use tax does, it is passed on to the consumers in higher rates.

That particular utility will have over $450 million of nonrebatable increased costs if they do this.

I find this a very difficult thing to justify. Would you care to comment on that?

Secretary SCHLESINGER. Yes, sir.

We have done four specific studies: the Middle South study, which I mentioned a few moments ago—indeed, in Louisiana, there would be a residual tax. We have also done a study of Houston Power & Light, and there should be no residual tax. All of that tax should be rebated. I do not think in the State of Texas that there would be any residual from the use tax for the utilities, but we can study that further.

We can expect that all of that money would be recycled to assist in the movement toward coal or uranium, as the case may be.

Senator BENTSEN. Mr. Secretary, I am advised very much to the contrary, and I want to see a resolution of this contradictory information I am getting.

Secretary SCHLESINGER. Absolutely. The purpose of the use tax is to provide a financial inducement, to make these moves, and when the use tax is working as intended, it will not result in any additional burden.

There are some exceptions, like Southern California and Louisiana, but it should not be an exception in Texas, and we will work with you to clarify that matter.

Senator BENTSEN. Mr. Secretary, I heard you comment on the guaranteed price for the conversion of oil shale, guaranteed price per barrel, and that that was an interesting or an attractive thought, but you wanted to study it.

I would assume that if we are going to give that kind of a guaranteed price for one exotic, that we would do it perhaps across the board in trying to bring on domestic production. We talk about methane, we talk about coal gasification, and all of the rest of it.

I can see some very strong justification for that, sir. And I feel that you are interested in seeing us develop that self-sufficiency and a guaranteed price. And that is a price above world oil, is it not, that you are talking about?

Secretary SCHLESINGER. Yes, sir.

I would not want to do it across the board, but selectively for those areas that seem promising——

Senator BENTSEN. You mean you might exclude natural gas, is that what you are saying?

Secretary SCHLESINGER. We might exclude natural gas from geopressurized zones, sir.

Senator BENTSEN. It is a difficult thing for me to accept the fact that this is the one instance where we are not willing to pay domestic producers as much as we will pay foreign producers. If we are talking about any other commodity, we are talking about paying our domestic producers as much as we will pay the foreign ones.

Now, we are talking about paying $2.16 to Canada for 900 billion cubic feet of gas. You said you questioned whether you would pay more than that to Mexico, but the word I get is that they are going to pay substantially more for some 700 billion cubic feet out of Mexico.

Mr. Secretary, the cost of developing oil and gas in this country is going to continue to escalate as we bring on the reserves that are harder and harder to develop. And I am one who believes that, insofar as those new reserves found, that you have to have the incentive and you ought to be willing to pay what you will pay for the foreign import.

I notice on the Brookings report they have stated on the setting of national priorities, and referring to the national gas discussion, with these words:

> These proposals will not eliminate the gas shortage; they will partially disguise it and extend it to the markets that are not controlled. In addition, they will remove the market test for supplemental gas supplies and encourage investment in uneconomic facilities and processes.

Now, if you believe that the Brookings Institute is wrong, would you tell me why?

Secretary SCHLESINGER. Well, there are a number of statements in there and some of them are correct. Indeed, there is no assurance that this will eliminate the natural gas problem. That problem stems from the insufficiency of oil and gas resources in the United States, and oil resources over the immediate term worldwide.

It is intended to alleviate the problem. It moves toward the national market, and of course, for those users who have had a protected market in the past, there will be some disadvantage. I go back to what you said earlier, that 87 percent of the boiler fuel in Texas is natural gas.

We have some concern about the State of Texas and the impact on the State of Texas of removing controls from the price of natural gas.

In last winter's market with the redetermination clauses, the most-favored-nation clauses in Texas, the price of gas from Texas would have run up to $5.50 to $6, and for a gas-dependent State like Texas, that would have been close to catastrophic.

One of the principal——

Senator BENTSEN. Dr. Schlesinger, we took care of that by vitiating the most-favored-nation clauses and putting some limitations on that. We are talking about new gas and the price for new gas, and finding that. And I supported the limitation on the favored clause, the renegotiation clause.

Secretary SCHLESINGER. That was in the Emergency Natural Gas Act.

Senator BENTSEN. That is correct, but we are now dealing with a different set of circumstances. Indeed, the Congress with, I believe, the support of the Texas delegation at that time, were heartily in favor of a cap, and were not in favor of turning this over to free market sources.

Secretary SCHLESINGER. For good reason.

Senator BENTSEN. No, I would beg to differ with you on that, Mr. Secretary. We were in favor, many of us, in favor of the limitation on the favored-nation clause that would have triggered those prices, but we were also in favor, most of us, I think, of the free market system on the finding of the new gas itself, to try to bring it onstream and try to develop self-sufficiency in this country.

Secretary SCHLESINGER. I was referring to the emergency sales.

Senator BENTSEN. All right.

Now, on the small refineries, I am concerned about their continuation. I believe that they provide a competitive force and a discipline that helps. I am also concerned about some of the abuses that took place and some of the ripoffs that took place, and we would like very much to have your help in finding a way to see that they continue to assist in competition and also limit the abuses at the same time. We are delighted with you on that.

Secretary SCHLESINGER. Thank you, Senator.

Senator TALMADGE. Senator Curtis?

Senator CURTIS. Dr. Schlesinger, you have recommended to this committee a very major tax program. It has been emphasized by the distinguished Senator from Virginia and others. The witnesses that we have heard, other than the testimony of yourself and your associates, have all been against this.

Every avenue of the American economy, labor, management, and so on, with one exception. My recollection is that the representatives of the Nader organization appeared here and supported the administration's viewpoint and the House bill.

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I asked that witness what was in the proposal that would increase production of oil and gas, that provided an incentive for increased production. I would like to ask you the question.

What is in the proposal that you asked this committee to advance, that will increase the production of oil and gas within the United States?

Secretary SCHLESINGER. On the wellhead tax, the intention is to permit the price for new oil to go to the world price from the present $11, approximately. That would be an increase in the price for new oil of about 40 percent, and it would be the most handsome incentive to be found anywhere in the world. It is an incentive far beyond the dreams of the industry 4 years ago.

I think that there is no question that the new oil price is a powerful incentive. Indeed, we have here a copy of Forbes magazine which says, "go get it, fellows." I will submit it for the record. And there is a rundown of the other very powerful incentives in this plan.

[The following was subsequently supplied for the record:]

[From Forbes, June 1, 1977]

GO GET IT, FELLOWS!

There's a lot more oil and gas waiting to be found in the United States. For all the moaning and groaning you've heard, President Carter's energy program does give oilmen powerful incentives to find it.

Many businessmen were disappointed that President Carter's energy program did not permit the price of domestic oil to rise to world levels. But it is wrong to conclude, therefore, that the program does not contain any worthwhile incentives for finding oil and gas. The program does contain a very major incentive: The price of newly discovered oil would be allowed to float up toward world prices. This is a hefty incentive indeed. The world price at present is $13.50 a barrel, while under present laws and regulations "new" U.S. oil brings only $11.28. The extra $2.22 ought to make a great deal of difference toward producing the new oil and gas the Administration privately concedes the U.S. needs for the rest of the century.

Natural gas? There are incentives here, too. "New" new gas would be price controlled at $1.75 per thousand cubic feet. This is less than new gas produced in Texas sells for in Texas these days (intrastate gas would be brought under the same ceilings as interstate gas under the Carter program). But it is considerably more than gas sells for elsewhere in the nation today. The new price makes the interstate market attractive and assures drillers—who have to see $1 per mcf before they'll even think about drilling these days—that the price trend for gas is up in the U.S.

You would never realize all this from reading most accounts of the energy program, which tend to put a gloomy interpretation on the program's incentive aspects. You would never realize it, either, from reading the public pronouncements of most oilmen. But don't be deceived. Privately, many oilmen will concede that—for new oil at least—the program contains strong incentives. Why, then, is the industry crying poor mouth? In large part, because it knows too well that its open approval would amount to a kiss of death.

The world market price for oil, which would be adjusted continually for domestic inflation, is the kind of money and policy that is likely to bring about an increase in new-field exploratory drilling. This kind of drilling has been declining since 1974, according to Petroleum Information, Houston's influential statistical service. PI points out that while 25,794 oil and gas wells were drilled last year, the number of them that were in new fields—attempting to establish new reserves—fell 3%, to 6,289.

There is more drilling going on in the U.S. today than at any time in almost 20 years, but the trend has been toward reworking old territory, pumping more from reservoirs that were not payworthy when oil was much cheaper. This kind of drilling does not add to proven reserves.

The Carter program means to shift the emphasis to true exploration. if the program—or the pricing part of it—gets through Congress, the way is clear economically for drillers to go deeper into the Gulf of Mexico and to the frontier areas on the U.S. outer continental shelf.

It costs between $6 and $8—from lease purchase through production—to bring in a barrel of new oil in the U.S. today. At $11.28, the more difficult parts of the game may not be worth the risk; at $13.50, indexed to inflation, they may well be. Oilmen privately conceded the price is an incentive. Energy Secretary James Schlesinger is certain: "The oil companies can make more money in the U.S. than anywhere else in the world," he says. After all, the Georges Bank off Massachusetts is no tougher or riskier than Britain's North Sea.

Is the oil there for the finding? A good deal certainly is. The U.S. Geological Survey estimates that, at a statistical mean, there are 82 billion barrels of undiscovered recoverable reserves of oil in the U.S. That dwarfs the current 39 billion barrels of proven reserves. The Geological Survey also estimates that 484 trillion cubic feet of natural gas remain to be discovered—roughly equal to the total U.S. gas production to date. Exxon is a little more conservative in its estimates of attainable new reserves, preferring 63 billion barrels of oil and about 287 trillion cubic feet of gas. Shell Oil, on the other hand, is a bit more optimistic than the Geological Survey. It is a choice of riches.

And the oil companies have the cash flow ready and waiting to plunge into a new round of exploration. Exxon alone is running a cash flow of more than $4 billion a year; Mobil, Texaco and Standard of Indiana are each at $1.5 billion. The North Sea and North Slope are producing, beginning to return the investments made in them by the oil companies since the mid- to late-Sixties. The costly Alaska pipeline will begin throwing off cash rather than swallowing it. The industry's capital and exploration budget for this year runs to $30 billion, estimates Dallas' authoritative Energy Management Report. In 1973, before the oil price rise, it stood at $9 billion. The oil companies want to put it into exploration in the U.S. because geologically its attractiveness is second only to the Persian Gulf, and politically there is no place as attractive.

Frederick Z. Mills, the respected oil services and equipment analyst of Rotan Mosle Inc., has just taken a look backward and forward. He notes that 1956 was the last time the major oil companies plowed back as great a percentage of their wellhead revenues for drilling in the U.S. as did the independent producers. That was also the year when U.S. oil and gas prices began a long decline in real terms and the majors began in a big way to shift their exploration overseas and to put their investments into refining, transport and marketing and into diversification, importantly in chemicals. But now wellhead revenues in the U.S. are rising again, and Mills sees the majors putting more of their rising revenues into U.S. drilling, not just this year, or next, but out to 1990.

Last year the oil industry pumped up $1.1 billion for leases, in the Baltimore Canyon off New Jersey. That nothing has happened off the New Jersey coast to date is not the industry's fault, but is due to a court battle in which environmental groups and the Long Island counties of Nassau and Suffolk are trying to prevent development, preferring to get their oil and gas from offshore Galveston if not offshore Saudi Arabia.

About the only thing, then, that could prevent a vast new drilling and exploration boom is environmental politics. But Interior Secretary Cecil Andrus, himself a noted environmentalist, has just committed the nation to about the fullest possible development of the areas offshore, where our potential reserves lie. There will be a lease sale in the Gulf of Mexico this month, in Alaska's Cook Inlet in October and off Massachusetts in November. Next year will see three additional sales in the Gulf of Mexico and two more in Atlantic waters. Besides these, Andrus promises more to come in Alaska and offshore before 1980.

Andrus noted the "critical need" to develop U.S. oil and gas resources in announcing his lease schedule May 17. He is under no illusions about how long it will take to shift the U.S. energy base. Like Carter, Andrus sees conservation and conversion to coal alleviating U.S. dependence on foreign oil in the long run. "But we have to produce more oil and gas in the short range—or we have to buy more foreign crude, and I'm not in favor of that." That is why Andrus is opposing the environmentalists in the Baltimore Canyon case: He wants to get U.S. exploration off the dime.

Some complications may be added by the pending amendments to the Outer Continental Shelf Act of 1953, which the Congress takes up this summer. The

worst effect of the amendments proposed for the OCS Act is that they would lengthen the time between lease sale and production of oil by two years—to nine years from seven. Under some clauses supported by Senator Henry M. Jackson of Washington, the government itself would hire a drilling contractor to go out on the shelf and drill a few to see what is there. The oil industry sees in this the shadow of the national oil company they suspect the Washington bureaucracy dreams about.

Don't be surprised, therefore, if the oil industry continues to meet roadblocks. But the problem is not lack of incentive. At $13.50 a barrel, there is all the incentive any oilman would want to go out and search for oil in the hard and risky places.

Senator CURTIS. Well, now, it will go to the world price for whom, the seller or the buyer?

Secretary SCHLESINGER. The price of all oil at the refinery gate will be uniform at the world price. But you are quite correct, Senator, that the supplier will not receive the world oil price on all oil produced; simply on new oil.

That is, we are placing a powerful incentive to go out and explore and develop for new oil. So any new oil would receive the world oil price, but not the existing inventories.

Senator CURTIS. But what is in this legislation that would directly encourage the exploration and discovery of new oil and gas?

Secretary SCHLESINGER I think that the price of $14.40 which is 4½ times that which applied to new oil just 4 years ago is a very handsome incentive. I do not think that there is any question about the price incentive for new oil. I think the questions have been raised, Senator, about the opportunities and the pace of the leasing of the Outer Continental Shelf, and matters similar to that.

But the price incentive for new oil is very generous, both on a historical basis and by comparison to anything else in the world.

Senator CURTIS. Well, now, how much money will be collected by the so-called wellhead tax?

Secretary SCHLESINGER. There is a schedule. The wellhead tax will rise to a peak of approximately $14 to $15 billion a year gross, about $10 to $11 billion a year net when adjustments are made for lost income taxes, and then it will go down as the supplies of old oil and upper tier oil disappear and are replaced by new oil.

Senator CURTIS. Well, give us an illustration as to how the wellhead tax would be applied to a particular production operation, so that we would understand how much the tax would be in your illustration.

Secretary SCHLESINGER. There are at present three tiers of oil prices: Stripper, which is basically the world oil price; upper tier which is something on the order of $11.50; and lower tier which is about $5.25. This permits all oil at the refinery gates to go to the world oil price with no immediate substantial adjustment say, for inflation, in either category of existing inventories. On new finds however, we get the world price.

For older finds the old oil is now $5.25 per barrel and it would gradually be adjusted upward for inflation. The difference between that and the world oil price would be taxed away at the refinery gate so the producer would be receiving the same constant dollar for a barrel of oil.

Senator CURTIS. So the $5.50 oil—some of it is below that—would have a tax of how much a barrel?

Secretary SCHLESINGER. It depends on the world oil price. At $14.40 it would be almost $9.

Senator CURTIS. And none of that would go to the seller of the oil.

Secretary SCHLESINGER. No, sir. All of that would go to the Treasury.

Senator CURTIS. It would go to the Treasury of the United States?

Secretary SCHLESINGER. Yes, sir.

Senator CURTIS. Now, what incentive does that give to produce more oil and gas? Ordinarily the imposition of tax slows it down. I have never heard of a tax being applied to any segment of our economy that speeded up the economy.

Secretary SCHLESINGER. There are two aspects to that, Senator. I think that these were probably developed during the debate in the Senate over the EPCA proposal. But those kinds of arguments I think were spelled out. The main point is that the costly part of this business is going out and finding new oil which is increasingly hard to find, increasingly costly to find, and sometimes inaccessible for small pools. We want to put the premium there. That is the intent of the legislation.

Senator DOLE. Didn't the House strike that section?

Secretary SCHLESINGER. No, sir.

Senator DOLE. It did not delete that section?

Secretary SCHLESINGER. No, sir. On the old oil—those are existing fields. They have already been discovered. The costs associated with them as far as exploration and even large-degree developments have already been incurred. The cost of continuing to produce them are in the presumption of the legislation on the books below the price that is given for that oil. That may or may not be a valid assumption.

As I indicated to Senator Hansen, we want to review, to see indeed that the cost of recovery for that old oil does not exceed the price, otherwise, as the Senator indicated, those operations would be shut down. If they shut down, of course, we will lose the oil. We will have the effect that you describe and we want to study that matter in order to see to it that we don't lose any of that old oil and that the price for the old oil as well as the new is sufficient to cover the cost and the normal profit.

Senator CURTIS. Dr. Schlesinger, I think at least to my satisfaction history proves that attempts to manage the economy of the United States never works, it lessens production, increases cost to the consumers and to take oil and charge a $90 tax at the well head—the consumer will pay more and the amount he pays is not—it does not have an end result of inducing others to produce more at the receiving price.

It seems to me that the entire administration program has an overemphasis on conservation and not on production. We can conserve by a lot of ways that will wreck our economy.

Mr. Chairman, I have no further questions but I would like to ask unanimous consent to yield for one question Senator Hansen wants to ask.

Senator HANSEN. Mr. Secretary, some questions were submitted to you in writing on May 27 of this year. Mr. Alm responded to those

questions. If I may refer to page 90 of hearings before the Committee on Energy and Natural Resources the question was asked "What are the expected increases in revenue relative to the continuation of existing policy which will accrue each year through 1985 to the oil and gas companies as a result of the proposed price increases of oil and gas apart from the tax provisions?

And Mr. Alm responded, "From 1978 to 1985 oil and gas companies will collect cumulatively $3.9 billion in additional revenues due to the oil and gas price provisions in the plan." He continues, "the oil pricing conditions will decrease revenues by $11.4 billion compared to what they otherwise would be." He continues, "gas price provisions will increase revenues by $15.3 billion."

My question is, do you agree with Mr. Alm?

Secretary SCHLESINGER. That has been slightly modified, Senator, as a result of the House action, so that the figures are somewhat different. There will be a significant increase in the revenues of the oil and gas industry. There will be a slight increase in their revenues compared to what would have been the alternatives under the EPCA which would have been to fold in the upper tier oil after some years to the world price.

Senator HANSEN. If I read Mr. Alm's response accurately the oil pricing provisions by themselves result in a net loss to the industry between now and 1985 to totaling $11.4 billion. It is only because of the gas pricing increases, the $15.3 billion that they come up with $3.9 billion-plus.

Secretary SCHLESINGER. Those figures should be modified slightly, Senator. I believe they are correct. There is a distinction I want to underscore and that is that there will be a substantial growth of the revenues for the industry. Shrinkage of oil receipts is relative to what would have happened if the upper tier would have been folded into the world oil price which was what was previously contemplated under EPCA.

Senator HANSEN. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Secretary, please accept my apology that I have been in and out this morning. I wanted to recommend our nominee in the fifth circuit court, Judge Rubin, who is now safely on his way to being confirmed. We had him as a guest, and I had to help make a committee quorum. They are trying to get a couple of bills out of the Commerce Committee, and so I had to do double duty this morning. I appreciate my colleagues covering for me. My impression is you handled yourself very well before the committee.

I don't think any member of this committee would be tough on you if they did not think you could handle it. They pulled their punches because they like you.

Secretary SCHLESINGER. The committee is most compassionate.

The CHAIRMAN. Let me tell you the way this legislation looks to me. If I had to tell you like a friend, as I would tell the President if he would ask me where we stand on this bill, I would tell you now in my judgment this committee is not going to vote for these big taxes, for either one of them, unless the proceeds are to be used in a way that we would produce more energy.

The committee might be willing to rebate the money to the poor, but as far as those who are not poor, the middle income and upper income people, their view is that that money ought to be taken and used to produce more energy. The money should do double duty. It should be used not just to raise the price but it should be used in a way that would get the best overall results.

Now how much capital, Mr. Secretary, do you think is going to be needed to achieve energy independence in this country? How much money in 1977 dollars? What do your people tell you it would cost?

Secretary SCHLESINGER. I don't regard that as an appropriately attainable goal, Senator. But I could give you an estimate.

The CHAIRMAN. Has anybody thought about it? What is the estimate? There are bound to be estimates.

Secretary SCHLESINGER. The estimates run $600 billion or $1 trillion. They are very crude.

The CHAIRMAN. Nelson Rockefeller testified here a day or so ago. I assume that he has talked to his brother who is chief executive officer of Chase Manhattan Bank. The Chase has made a number of studies on that very question. I am sure you see their material and they see yours, and you compare notes just as they do. Many of you are relying on the same sources, some of which come from API or other industry sources. He estimated you would need $1 trillion during the next 10 years to move toward energy independence.

Secretary SCHLESINGER. Yes, sir, I think that is a reasonable ball park estimate.

The CHAIRMAN. Now, I think I was the only committee member here to hear Mr. Speer who was speaking for the iron and steel industry about their views on this bill. He said we ought to think of this crisis the same as we did when we met a national emergency before, as we did in World War II when we did a fantastic job of increasing production.

He said we should put a priority on energy, and other things ought to take a lesser status. For example, much as I admire our environmental friends, I think that there are some good points to be said for their side—if we are going to achieve energy independence they ought to sit in the back seat for a while. They should let somebody else drive the car and try to get us moving where we are trying to go.

I am not saying we should not consider what they have to say. I am just saying that the clean air should be maintained but the rate at which we further purify it at a minimum ought to be adjusted, and a higher priority should be to try to achieve energy independence.

Almost all the business witnesses as well as the American Federation of Labor and former Vice President and Governor Rockefeller who came before us recommended that we take a Reconstruction Finance Corporation approach to getting some things done. We found we could do fantastic things nobody dreamed we could do during World War II by using the Reconstruction Finance Corporation as a tool to finance them.

I don't see how we are going to get on expeditiously with developing the shale or the fantastic reserves of methane gas we have in the brine in Louisiana unless we do the kind of things that were done back in World War II when the Government loaned the money to Kaiser to produce aluminum. The Government created new competition in the in-

dustry as well as new production by putting Reynolds in the business, then they put Kaiser in the steel business, and somebody else in some other business. They got so much production going that when we had a big battle and we would lose 300 airplanes, people would say, "That is too bad, we lost 300 airplanes; but we produced 500 today. We will have our losses back and more the following day."

The other fellows could not do that. If we had those capabilities why don't we now crank them into this bill. Not as a substitute for existing producers, but as an add-on.

Secretary SCHLESINGER. Well, Senator, we would be prepared to work with you and the committee in terms of defining a financing authority. I cannot say at this juncture that the President would endorse it, but I think we can work with you to define such a financing authority and establish some criteria by which that financing authority would operate. I think it is essential to have criteria.

We don't want to subsidize everything. Some are self-sustaining activities and some activities we would not want to touch at all.

The CHAIRMAN. In terms of constant dollars, what the Reconstruction Finance Corporation financed over the period of its lifetime was to the tune of $257 billion, and the Government made a profit. It did not cost us a nickel. I am not saying we did not lose money. For example, the effort to build concrete ships did not work out as well as some people hoped. Notwithstanding the fact that some loans went sour, on the overall the effort was a tremendous success.

The Reconstruction Finance Corporation was started by Herbert Hoover to try to beat the emergency of a great depression. Franklin Roosevelt took it over, and he got more cooperation from the Congress and it did prevent a depression. It seems to me we ought to be doing something similar.

We should be developing shale as Senator Talmadge thinks we should do and I think we might have something better with methane gas in Louisiana. If either one succeeds, I should think their engineering problems probably would be completely solved 10 years from now. If we want to we can be completely energy independent, and we should be getting on with it. I am pleased to see you at least are sympathetic to that approach because I think the majority of the committee would like to do something like that.

Mr. Rockefeller estimated we ought to put to work 1,500,000 of the unemployed in this country in that effort. We should be moving in that magnitude to get some immediate relief. It seems to me that we should not only be doing what Senator Talmadge suggested about shortening the leadtime on building these atomic plants, but we should also shorten the time in drilling offshore.

Now, this committee has not had an energy bill recommended to the Congress before, but we have been voting on some that came from other committees. Most of those bills have been bills to impede energy production. For example, we voted for a strip mining bill, and we should tell the public what we did.

What that bill did not do was get us more energy. It provided a lot of additional environmental safety requirements before one can produce coal. When the energy crisis first hit, we estimated it would take 2 years from the time someone could get an offshore lease until

he could produce the oil and start getting it ashore. Another committee gave us a bill that extended the period from 2 years to 4 years.

Now I am told that the new Outer Continental Shelf legislation extended the period from 4 years to 6 years. That would mean that President Carter would have to be reelected to hope that any lease signed under his first term as President would produce a barrel of oil while he is still President. I think we ought to try to improve on that, and I have had a chance to at least mention this to the President—I think he agrees with it—these lawsuits ought to be made to be consolidated to one.

If someone wants to sue you to stop you from drilling in the Atlantic, they ought to be required to consolidate it in one lawsuit and argue every point that can be raised and get it over with.

These environmental impact statements are just silly. A lot of things in them are just silly. Everytime you go to drill another well you have to explore all possibilities. For example, would it be better to get the oil from the well to the shore by putting it through the pipeline or would it be better to use a ship or maybe to use a hot air balloon to take it to shore. All these possible ways that you might get the oil to shore, and any idiot would tell you the pipeline is running right past the well, so you just tap into the same pipeline that they did previously, and there goes the oil. As though that is not difficult enough they are contending that everytime you go out on the lease and drill one well, when you want to drill another well alongside it, you have to go through the whole impact process again. Does that make any sense to you?

Secretary SCHLESINGER. I think the process can be foreshortened.

The CHAIRMAN. That is what I am for. I am in favor of designating somebody—if he will accept the honor let's designate President Carter—to be the Nation's No. 1 environmentalist. Let's say by law the President is the No. 1 environmentalist, and if an energy project is ready to go, if he can put his signature on it, it is off and going and no court shall have jurisdiction to contest that. That may seem far-fetched, and we will have to ask you legal authorities to check it, but I am satisfied with that. My impression is that since the Arabs put the boycott on, everything Congress has done has been to keep us from getting energy or to slow down the production except one thing. That was the Gravel amendment.

Senator Gravel went out there and fought the Interior Committee to add an amendment that said, in effect, here is an environmental study. We have been working on it for years. Now I say let's build a pipeline. Let's say we approve of the study and that no court shall challenge it. That is the end of it and go ahead and build the pipeline.

Now I heard the argument—the argument went, Oh my goodness, if we vote the Gravel amendment nothing will ever happen. That is the end of the bill. We would have been better off without the bill. So we passed the bill with the Gravel amendment and the pipeline is there. If we can do that with that Alaskan pipeline and finally get something going, why can't we do that with some of the other projects?

Secretary SCHLESINGER. Mr. Chairman, you can. The problems that Congress has created can be disposed of by congressional action.

The CHAIRMAN. Thank you very much.

I would like to introduce you, Mr. Secretary, to the only man who has been successful in recent years in getting anything done to produce more energy, the Senator from Alaska, Senator Gravel.

Senator GRAVEL. Thank you, Mr. Chairman. Thank you for the kind words and I appreciate, Mr. Secretary, your statement that anything we agreed on we can dispose of. I wish we were that rational. I would like to ask one general question and I would like to submit a number of more technical questions for written response.

[The following was subsequently supplied for the record:]

OIL INDUSTRY INCENTIVES AND CASH FLOWS

Question 1. We have had testimony from various groups, including the USGS and producers, and we have obtained reports from such groups as the National Petroleum Council, that conclude that there are significant recoverable reserves available. Assuming all the conservation measures are taken, it is predicted that domestic production at existing rate will not increase the amount of domestic oil available. That, of course, means continued reliance on foreign oil.

The GAO, in its July 25 report to Congress concludes: "The Administration forecasts virtually no change in domestic production relative to a continuation of existing policy . . . also, the plan will reduce revenues to producers for most oil already discovered and may adversely affect oil companies' financial ability to support additional exploration. By not increasing the financial incentives for additional exploration and by reducing companies' financial strength, the plan fails to come to grips with the problem of increasing domestic crude oil production." What evidence does the Administration have that its plan will not only do what GAO says it will do, but that it will actually increase production of domestic oil?

Answer. The National Energy Plan provides the highest incentive available in the world for newly discovered oil—the world price. It also provides this price to other categories of oil which could provide substantial increased supplies: sophisticated enhanced recovery operations, and stripper wells. It does not provide the world price to classes of oil production which would show little or no response to higher prices: oil from presently flowing wells, or oil from reserves added to old fields. In 1978, present controls would allow approximately 15 percent of total domestic supply to sell at the world price. By 1980, the National Energy Plan increases this percentage to 22 percent and to 41 percent by 1985.

Petroleum liquids production under the Plan would increase from 9.7 million barrels per day to 10.6 mb/d in 1985. It accomplishes this by adding revenues and incentives where is appropriate—the most costly sources of supply. For example, it adds over 1½ billion dollars increased revenues to newly discovered supplies by 1985. It does decrease the revenues available for the supply sources which are not responsive to price; however, if the Plan is viewed in its entirety, although revenues from oil production are decreased from what would be available under present controls, the gas pricing provisions would increase producer revenues by an amout which more than compensates for the oil revenue decline. Producers will experience higher revenues for oil and gas production under the Plan than under continuation of present controls. We disagree that the Plan adversely effects the financial strength of the oil industry to support additional exploration for new supplies. Historically, cash flows from domestic production activities have exceeded domestic exploration and development capital expenditures; our forecasts illustrate that this will continue into the future.

	1973	1974	1975	1978	1979	1980
Net cash flow from operations	6.2	9.9	10.2	14.1	15.6	17.3
Capital expenditures	5.3	8.9	7.0	9.6	10.8	11.5
Excess of cash flow over capital expenditures	.9	1.0	3.2	4.5	4.8	5.8

In addition, there is no evidence that the financial health of the oil industry has been downgraded. As to bond ratings, we have examined the July 1977

Standard and Poor Ratings for 32 petroleum companies, and half of the firms had A plus or better. Another 9 had A ratings. Only 7 had B or BBB. All the majors were AAA except for Texaco, which had an AA plus rating. Marathon has dropped to an A plus rating. Texaco also declined from AAA to AA plus since December 1973. However, since December 1973, Kerr McGee went from BBB to AA. Occidental went from B to BBB. SOHIO from AA minus to AA. Texas Oil and Gas went from A to A plus. All other firms remained constant.

Finally, an alternative to provide higher incentives than the world price for increased production could have been proposed. This could have been done through some form of tax relief on direct subsidies which would alter the econnomics of oil and gas production to provide an effective price higher than the world price. However, one of the basic goals of the Plan is to produce consumption savings by pricing oil and gas supplies to the consumer at their replacement cost.

Question 2. A recent analysis of natural gas pricing proposals done by the Congressional Budget Office suggests that deregulation of natural gas prices will increase natural gas production by only 5 percent. Do you agree with the funding? If so, then what amount of increase can we expect from the President's plan that will put a $1.75 ceiling on the price of new natural gas, and $1.45 on other gas? What is the alternative source of gas? What is the cost of imported LNG now being brought in from Indonesia and Algeria? What will it cost to get gas from coal?

Answer. The general finding of the Congressional Budget Office analysis is that deregulation will increase natural gas production by only a small amount compared to its costs. Our analysis supports this finding. Ours does, however, indicate a 2 percent rather than a 5 percent increase in production. But this percentage difference in our estimates represents .5 TCF of gas, or one-half percent of domestic energy consumption projected for 1985.

Both the Congressional Budget Office estimate and ours represent increased production over and above what we expect from the President's plan. The ceiling price under the plan would increase production by 1.1 TCF above what it would be in 1985 if current policy were continued. This represents 75 percent of the production increase from deregulation.

The plan yields this increase in production because its ceiling is not fixed at $1.75 but rather is bed to the Btu-equivalent of domestic crude oil. As a result, prices of newly discovered natural gas would increase from $1.75 Mcf initially to $3.23 per Mcf in 1985, a 9 percent annual price increase.

Additional sources of gas in 1985 would be of high cost. The cost of the extra gas obtained through deregulation would be high because constraints on the rate at which domestic production of conventional gas could rise would yield a small amount of additional production at high cost. Other potential domestic gas, especially any unconventional gas such as geopressured brine and Devonian shale which becomes available by 1985, would be high cost because of the large investments and expenditures associated with its development and production. To encourage production of unconventional gas where appropriate, the plan provides special pricing authority.

Another example of unconventional gas is gas from coal. Current estimates indicate that additional supplies of gas from coal could cost $3.30—$4.30 per thousand cubic feet. Imported LNG from Indonesia and Algeria, which currently costs $3.00–$4.00 per thousand cubic feet, would be another source.

The final source would be to reduce wasteful use of gas through direct conservation measures such as residential insulation and through substitution of coal for gas in low priority uses such as boilers. The plan proposes a wide range of measures to make additional gas available through both direct conservation and coal replacement.

Question 3. In existing fields with controlled prices at lower or upper tier, the oil companies have no incentive under the President's plan to increase production by drilling new wells. In fact, in Alaska, some wells are being closed down because the costs of operating the platforms have exceeded the revenue which can be derived from these wells. The wells which are being shut down are wells which produce 2,000 barrels a day or more. Can you suggest some means by which we can assure that our existing fields, where we have proven reserves, will be fully developed?

Answer. The President's energy plan provides a wide array of means to assure that proved reserves in existing fields are fully developed. First, the

plan provides that future prices of controlled oil will be adjusted to keep pace with inflation. Secondly, where opportunities exist to increase production in existing fields above the ever-declining levels which define old oil under current regulations, this production will qualify for at least upper tier, or new oil, prices. In addition, where tertiary recovery methods are used to achieve these increases, regulations will permit this production to receive even higher prices. Finally, where existing fields are too mature to justify any possible increases, the stripper well exemption is available to maintain production which is economic only at uncontrolled prices.

These provisions of the plan and current regulations, however, may not address every situation where special pricing should be provided. Your example of high-volume Alaskan wells may fit this category. Austerity exists under current regulations, through the exceptions and appeals process, to provide incentive prices to maintain production subject to special circumstances such as these. The record with respect to the process indicates a high degree of responsiveness, since 50 percent of requests made to date have been approved.

Question 4. The President's bill, as originally delivered to the House, had a classification referred to as "New New Oil," which would have not been subject to price controls. Would the Administration support a return to such a concept in our version of this bill, or do you now favor the House approach of controlling the price of all oil?

Answer. The Administration supports the concept of newly discovered oil pricing which retains a degree of control as long as world oil prices remain subject to arbitrary control, and domestic supplies are insufficient to meet domestic needs. For this reason, the President's plan calls for a newly discovered oil price which would be allowed to rise over a 3 year period to the current 1977 world oil price, adjusted to keep pace with the domestic price level. Afterwards, the price of newly discovered oil would be adjusted for subsequent inflation.

Question 5. The oil equalization tax is designed to bring the price of U.S. oil to consumers up to the world price. There is a tax on gas which would bring it up to the Btu equivalent price of #2 distillate oil. Then the industrial user tax will increase the price of oil for industrial users above the world price. This will leave gas underpriced in relation to oil and will encourage the shift of industry to gas where coal conversion is impossible. In light of limited projections for expanded gas supply, why encourage such a shift?

Answer. The industrial user tax for oil will bring the price of distillate fuel oil above the after user tax gas price but will base the price of residual fuel oil below the after tax natural gas price. The relative fuel prices plus the rebate credit include three types of fuel switching:

oil to coal;
gas to coal;
oil to gas.

The shifts from oil to gas will be modest because residual fuel oil will still be less expensive than natural gas. However, these shifts serve the important function of reducing oil imports in the short term. If natural gas were priced at the after tax distillate price, there would be a substantial shift from gas to oil and imports would rise dramatically in the short term. The incentives are designed to shift users directly from gas to coal, rather than going through an intermediate oil stage.

Question 6. Is the Administration planning a second phase of the energy program which would focus on production, or are the production inventives you refer to in the present plan all you expect to offer?

Answer. The Administration currently is focusing its efforts on the legislative program put forth earlier this year. No doubt, additional efforts and follow-up planning will be needed as a result of outcome of the current effort. At this juncture, however, we believe that the incentives provided by the President's energy plan are adequate to stimulate all of the production which can be achieved.

Question 7. A recent article in the Smithsonian Magazine indicated that about 113,000 megawatts of hydroelectric potential remains undeveloped in the United States. A Federal Power Commission study asserts that if only 10 percent of our 50,000 existing small dams were developed for hydroelectric power, we could save 180 million barrels of oil per year. Such a savings could be achieved with no reduction in environmental quality because these dams are

already in place. Much of this small hydro capacity is in the Northeast where power is needed most. What does the President's program and the Department of Energy plan to do about the development of this potential?

Answer. The President's program recognizes that new or additional hydroelectric generating capacity at existing dams could be installed at site near major demand centers currently dependent on imported oil. Initial estimates indicate that the cost of electricity generated at these sites could be economically attractive. But, our estimates of the potential is about one-tenth of the potential identified in the Smithsonian Magazine. In order to better identify this size of this potential, the Corps of Engineers and other responsible agencies have been directed to report on the potential for additional hydropower installations at existing dam sites throughout the country.

Senator GRAVEL. What evidence have you or the administration have that you are prepared to show the American people and show this committee that the continuing policy we have had on natural gas since 1954 and the policy we have had on oil since 1971 should be continued in the face of our increasing dependence on foreign sources of energy.

As I view the situation since 1954, with the Supreme Court decision on natural gas which brought about Government regulation, and since 1971, with the advent of the regulation of oil this is the only sector of our society that is totally controlled and it is the one that is most in trouble—and you can draw from that whatever message there is. I know our rationalization, but what is the administration's reason for a continuation of a policy which in time has only brought about a greater dependency?

What evidence is there to indicate we should continue doing what we are doing? As I interpret the present legislation, what we are doing is basically to continue Government control over our energy system.

Secretary SCHLESINGER. I would hope that you are wrong and I would suggest that there are other industries in far greater difficulty than the oil and gas industry which at this reading is flourishing most notably in your own State. Profits are increasing. Since 1973 the number of drilling rigs in operation has tripled in this country. We have more seismic teams in operation than we have had previously.

So as far as the activity of the oil part of the oil and gas industry, we have had very great success as a reflection of these higher prices brought about by OPEC. And it is stimulating considerable activity in this country of a sort that we have not seen since the late fifties.

With regard to natural gas, I would agree with your general observations except that I would describe the policy that the administration has presented as a noncontinuation of the policies that emerged after the Phillips decision.

Indeed, what we have proposed is to get away from the historic cost basis of the Natural Gas Act and to provide good incentive prices. There will be some disagreement as to whether a $1.75 per Mcf is that good an incentive price, but almost everybody in the industry will agree it is pretty good. We would establish incentive prices and get away from historic cost basis.

Now, that proposal of the administration was somewhat modified in the House of Representatives. It went back toward the character of the Natural Gas Act but we would still describe this policy as a noncontinuation of the prior policy. Now, why must we retain, at least for the time being, price controls? Because the world oil market, which

is the principal energy market is now dominated by a cartel which has costs of production as low as $1 a barrel and charges prices of $14.40 a barrel.

The price is administered overseas. Our own companies would naturally like to be the principal beneficiaries of that monopoly price. That is an objective that not everybody will share and so if the price is to be administered, it should be administered by the U.S. Government and not by foreign governments.

Senator GRAVEL. Mr. Secretary, taking your first point that oil companies make a greater profit, I disagree with that and I cite tables from Financial World which I have here. I could cite Fortune magazine. I could cite Forbes also.

I point to the July 15, 1977, Financial World at page 35, "Return on Total Capital for the Top 10." There is not one oil company in the top 10, and I will read you the top 10: Tandy Corp., Avon, American Home Products, Tampax, Marsh and McLennan, Petrie Stores, Maytag, Westmoreland Stores, Levi Strauss, and Fort Howard Paper.

In return on capital, oil ranks at 10.6 percent, which is below the national average. Coal and uranium, which this Congress is rushing to skew further is at the top with 21.9 percent return on capital. You say that my State is flourishing. It is not flourishing. I had a delegation of oil people in my office yesterday telling me how platforms will be shut down because of the capriciousness of your action. I have a chart here that I will make public, and put in the record, to show how every time the companies have been able to get a higher price from the Federal Government, there has been an increase in production. But I point to what happened with the average price of oil—you see where the controls have come in and you see the cost of drilling.

Now, it does not take a genius to figure out that there is activity that is going to cease because the cost of drilling has increased above the amount of oil that you are going to get.

This whole study that I have asked one of the oil companies to put together with respect to their operation at Cook Inlet consists of charts and layouts that record disaster. If you can talk of incentives for new oil—which I don't think you are there—it sounds good in rhetoric, but what you are doing is sinking what we have in hand for some potential in the bush.

[The study referred to follows. Oral testimony continues on p. 1497.]

ATLANTIC RICHFIELD CO.,
Washington, D.C., September 14, 1977.

Hon. MIKE GRAVEL,
U.S. Senate,
Washington, D.C.

DEAR SENATOR GRAVEL: Last month in Anchorage you asked if Atlantic Richfield Company could provide data that would support a statement made to you that "Federal control of crude oil prices acts as a constraint on the ability of oil producers in the Upper Cook Inlet Basin to maximize the volumes of crude oil that can be economically produced from the fields in this basin." The attached document is submitted to you in response to your request.

The data contained in the submittal provides information in two general categories. First we show historical facts about industry activity in the Cook Inlet area that indicate substantial industry response to crude oil price increases that were realized beginning in 1973. This response was largely in the form of additional development drilling which had the result of increasing the rate of oil production and ultimate oil recovery from the fields. These data are

for the most part a matter of record, contained in reports published by the State of Alaska.

The second part of the submittal provides A.R.Co. estimates as to the added volumes of crude oil that could be recovered from the Cook Inlet Fields if production could be sold at free market values.

As you know these data were drawn together in some haste. More definitive studies would involve exhaustive reservoir, drilling and economic analyses requiring substantial additional time. However we believe the estimates provide a reasonable representation of events that could occur following any price control relief that might be forthcoming.

Use of this information concerning the potential added oil recovery should recognize then that we are attempting to provide a generalized guide as to maximum possible benefits that may arise if crude oil prices were decontrolled. Atlantic Richfield Company is dedicated to a policy of achieving maximum economic oil recovery from all of the fields in Cook Inlet where we have a financial interest.

I am sure you recognize that there are numerous factors which influence specific investment decision in Cook Inlet fields, however the most important of these is crude oil price.

Sincerely,

JESSE P. JOHNSON,
South Alaska District Manager.

DATA PRESENTATION BY R. C. HEINTZ AND J. W. HART, SOUTH ALASKA DISTRICT, PETROLEUM ENGINEERING GROUP, ATLANTIC RICHFIELD CO., ANCHORAGE, ALASKA, AT THE REQUEST OF U.S. SENATOR MIKE GRAVEL, SEPTEMBER, 1977

PURPOSE

To provide factual information to support a general statement that there is a definite relationship between the rate of oil production and volumes of oil to be recovered from the oil fields in the Cook Inlet Basin and the price that operators are allowed to receive for such oil production; i.e., at a price higher than the current posted price for "old oil," more oil would be produced from the existing fields in this oil province. Cook Inlet fields do not now receive any stripper price incentives nor would they under any regulation currently under consideration by either the FEA or the Congress. This is because the wells in Cook Inlet fields reach their economic limit at rates hundreds of barrels a day above the current stripper threshold of 10 barrels per day.

EXHIBITS

1. Location Map—Cook Inlet, Alaska showing the thirteen oil production platforms in Cook Inlet and the Swanson River Field, the only onshore oil field in the basin.

NOTE.—Exhibits 1 through 6 comprise a general review of historical events from all oil fields in the Cook Inlet Basin during a period in which both oil prices and drilling costs increased sharply. Exhibits 7 through 15 show data for three specific fields, McArthur River, Swanson River and North Trading Bay to provide a more detailed picture of the effect of earlier oil price increases and the possible effect of a free market price for all production.

2. Plot of yearly average oil price versus time. The price plotted for years 1972 to current is the average price received by Atlantic Richfield Company for its share of oil production from the Cook Inlet Basin. Shown for general information prior to that time is a posted price representative of all Cook Inlet production. Yearly average points are used except for 1973 where monthly values are plotted to show the sharp price increase in more detail. The change from $3.20/B in April, 1973, to $5.20/B in December, 1973, is largely due to increases in posted prices. Only minor amounts of "new" oil were produced during December. Little change has resulted since December, 1973, with a gradual decrease since late 1975 to the current level near $5.10.

3. Yearly number of well completions in Cook Inlet 1968–1977. Also shown is the number of well completions in the three fields which will be discussed separately. Initial field development was essentially complete by 1972, with well completions decreasing from over 70 per year to less than 10. Several drilling rigs were activated in 1973 and the first half of 1974, motivated in large part

by 1973 oil price increases. Oil price incentives for "new" oil played an important role in expanded drilling programs during 1974, 1975 and 1976. However, the loss of upper tier oil price incentives in some of the major fields during 1976 was a major contributor to the recent decline in drilling activity. Under existing regulations 1977 drilling has been limited with few exceptions to fields where upper tier prices can be realized. With proper economic incentive drilling activity would likely have been substantially greater.

4. Plot of oil production rate from all Cook Inlet fields and the total of three fields to be discussed in detail. The upper solid curve shows actual total Cook Inlet production. The dashed curve beginning in 1974 was an estimate made at that time which assumed no additional drilling. In-fill development drilling during the 1973–76 time period, motivated by higher crude oil prices, was responsible for most of the increase in oil rate that has been realized through this period.

The oil rate from McArthur River, Swanson River and North Trading Bay Fields was held essentially flat during 1974 and 1975 in the face of an established decline trend by drilling, with a total of over 30 completions. By mid 1976 all upper tier oil price incentives had been lost for these fields as a result of production decline and other factors. Well completions fell to 7 in 1976. No new wells have been completed so far this year and there is no drilling activity in the fields at this time. The fall in rate during the past 18 months is most certainly related to the termination of drilling programs in these fields.

5. Cook Inlet incremental oil recovery due to 1974–1976 drilling. Our current projection of actual recovery to 1/1/78 from Cook Inlet fields will exceed the 1974 projection (dashed curve-Exhibit 5) by over 30 million barrels. The increase in ultimate recovery from the basin may be as much as 50 million barrels.

6. Summary of activity in Cook Inlet since 1973. Expanded drilling activity followed the 1973 oil price increases, but continues with few exceptions only where upper tier prices are received. Production rate has exceeded a 1974 estimate by 20,000 B/D. An additional 30 million barrels will be recovered by year end as compared to this previous estimate.

NOTE.—Exhibits 7 through 15 show data pertaining to these specific Cook Inlet fields—McArthur River, Swanson River and North Trading Bay. These fields were chosen to illustrate particular points, but are typical examples of Cook Inlet oil fields. These data are included to provide a more in-depth understanding of the relationship between a field's rate and recovery and the price received for production.

North Trading Bay

7. Production plot of North Trading Bay since first production. This is one of the smaller Cook Inlet fields containing about 53 million barrels initially. Production began in 1968 and peaked near 15,000 B/D in 1969. The field has been developed from two production platforms with a total of 10 wells. The field was unitized in 1971 and water injection began the following year. One of the field's best producers, Spark Platform Well S–8, was completed in 1972 resulting in a relatively high base rate for later old–new oil calculations. Oil price increases in 1973 prompted three drilling rig projects during 1974 with a resulting rate increase to near 7,500 B/D. The incremental production from this drilling will total over 2 million barrels. Two additional drilling projects were evaluated, but the sharp rise in drilling costs in 1974 without a corresponding rise in crude oil prices left the projects unprofitable. A.R.Co. presented data to the FEA in December, 1974, in an effort to obtain price relief so that the wells could be drilled. We were denied relief and as a result terminated our drilling program without drilling these wells.

8. North Trading Bay production plot. With no new drilling projects, production has steadily declined since 1974 to current levels near 2500 B/D. Rate is projected to continue declining to a level of 2,000 B/D during early 1978 at which point we will no longer recover the direct costs required to operate the platform. Unless the regulatory price is allowed to rise to market value for the oil produced, we will have no economic incentive to continue operations after the rate falls below this 2,000 B/D level.

An oil price increase to free market levels would allow us to add to the field's recovery in two ways. First, new drilling could be justified. The two wells planned for 1974 could still be drilled with projected rate increases shown on the plot. Second, free market prices would allow us to continue operations to a lower final oil rate. Economic incentive would remain until production declines

to 1,000 B/D, about half the daily volume required now to recover direct expenses. The combination of these two factors would allow us to recover 2.5 million barrels that will otherwise be left in the ground if we abandon the platform.

Swanson River Field

9. Production plot of Swanson River Field. This field contained about 435 million barrels initially and is the only onshore oil field in the Cook Inlet area. Discovered in 1957, secondary recovery by high pressure gas injection was begun in 1962 resulting in peak oil rates near 38,000 B/D during 1967 and 1968. A total of 68 wells have been drilled in this field including eight well completions between 1969 and 1972. Current cumulative production from the field is about 175 million barrels. The production sag in 1972 reflects curtailment resulting from a plant explosion in February of that year.

A new drilling program was initiated in 1973 and expanded through 1974 and 1975 with higher crude oil prices acting as a major economic stimulus. Through a portion of this time three rigs were active in the field, resulting in a total of 14 new completions over the two year period. Additional ultimate recovery due to 1973–75 drilling is estimated to total 8 to 10 million barrels.

A labor strike in the summer of 1975 caused a production curtailment below the "base production control level" (BPCL) for upper tier prices over a period of several months. Drilling activity was also disrupted through the strike period. The BPCL underage accumulated during this time, plus the disruption in drilling, eliminated further upper tier oil price realization from field production. Planned drilling projects were completed, but no new wells were started after November, 1975. Exhibit 9 shows the 1976 BPCL at about 24,000 B/D to indicate the level of production required from this field to realize upper tier prices. The dashed lines on this graph show the change in production decline trends experienced with drilling activity and without.

10. List of potential projects with free market oil prices. This list was prepared by the field operator, Chevron, U.S.A., to illustrate the magnitude of possible additional recovery which might be realized with a free market oil price. A total of twenty-five wells are listed for possible drilling rig work with a potential added recovery of over 9 million barrels. At the current lower tier crude price these projects would not be profitable.

11. Swanson River potential recovery. Total oil recovery from the Swanson River Field could be increased by as much as 24 million barrels under free market oil prices. This includes 15 million barrels estimated by extending field life and 9 million barrels from new projects.

McArthur River Field

12. Production plot of McArthur River Field since 1970. This is the largest field in Cook Inlet with about 1 billion barrels initially in place. Production began in 1967 with pressure maintenance by water injection commencing less than two years later. The field has 72 wells drilled from three production platforms with a cumulative recovery of about 315 million barrels. A technical article is included in this package describing this field in more detail. Also shown on the plot is the number of well completions each year. A marked production decline was experienced during 1972 with no new wells being drilled since completion of initial development during 1970. This decline is shown on the curve. Beginning in 1973, new wells were drilled to develop the field to a generally denser spacing. The success of this program, enhanced by increased oil prices for "new" oil above the BPCL, provided continued incentive for drilling. In the following two years a total of 16 new completions were made. These new wells, along with expanded platform oil handling facilities, allowed the field to reach record levels of oil production in 1974 and again in 1975. The highest level ever achieved was in excess of 110,000 B/D in September, 1975.

In April, 1976, an explosion aboard one of the field's three production platforms caused production to fall well below the field's BPCL for a period of three months while this platform was shut in for major repairs. A major cumulative deficiency beneath the BPCL accrued during this time, eliminating probably for all time any opportunity for upper tier prices.

Application for relief from the deficiency was made to the Federal Energy Administration in May, 1976. This application was denied. A subsequent appeal filed in September, 1976, was also denied in a ruling dated December 15, 1976.

Drilling from two of the field's platforms continued through 1976, but by the

end of the year drilling operations had ceased. It is quite likely that other wells would have been drilled if upper tier oil prices could have been realized from the new wells.

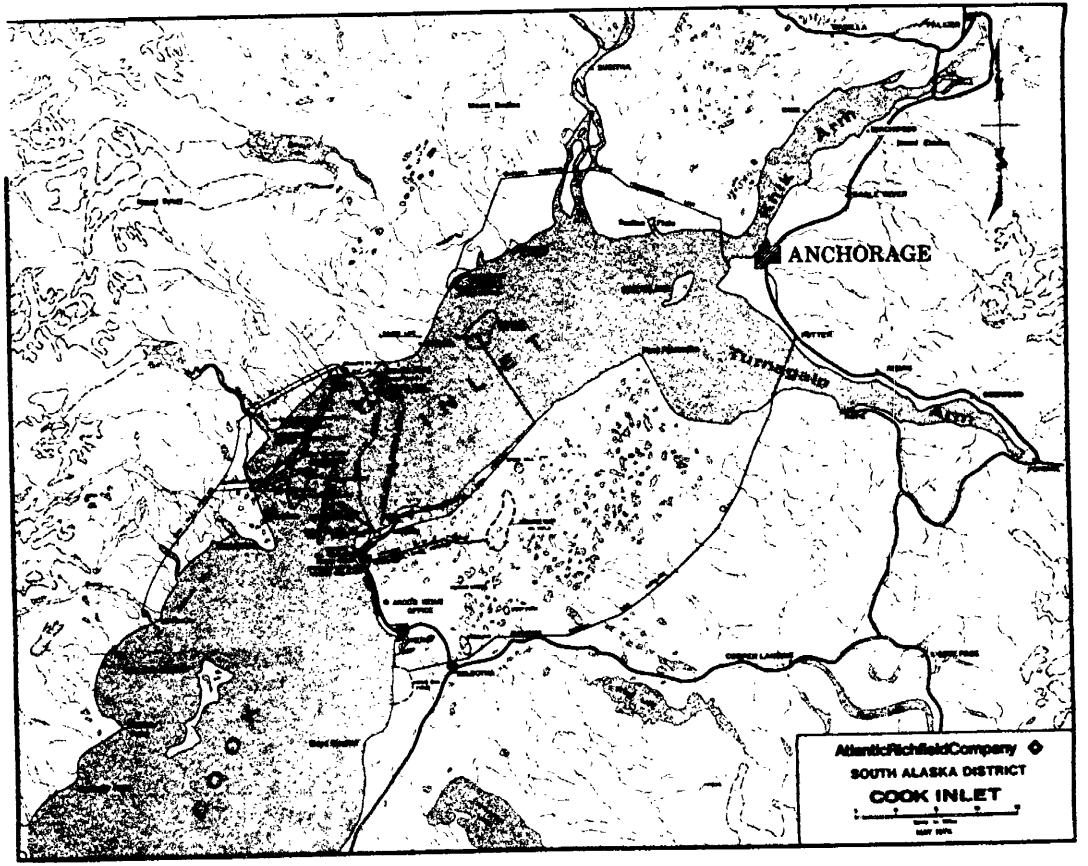
13. Oil price and drilling cost projections. This graph shows prices realized for Cook Inlet production and average costs of drilling wells at McArthur River using 1969 as a reference year. As discussed earlier, oil prices rose sharply during 1973, but have since remained essentially level at just over $5/B. Drilling costs experienced a similar steep increase during 1974, but have since continued to rise in contrast to the leveling of crude prices. Estimated completed cost for a new well in 1978 will be $2.9 million, about a 70 percent increase over 1974 costs—while oil price has remained essentially unchanged.

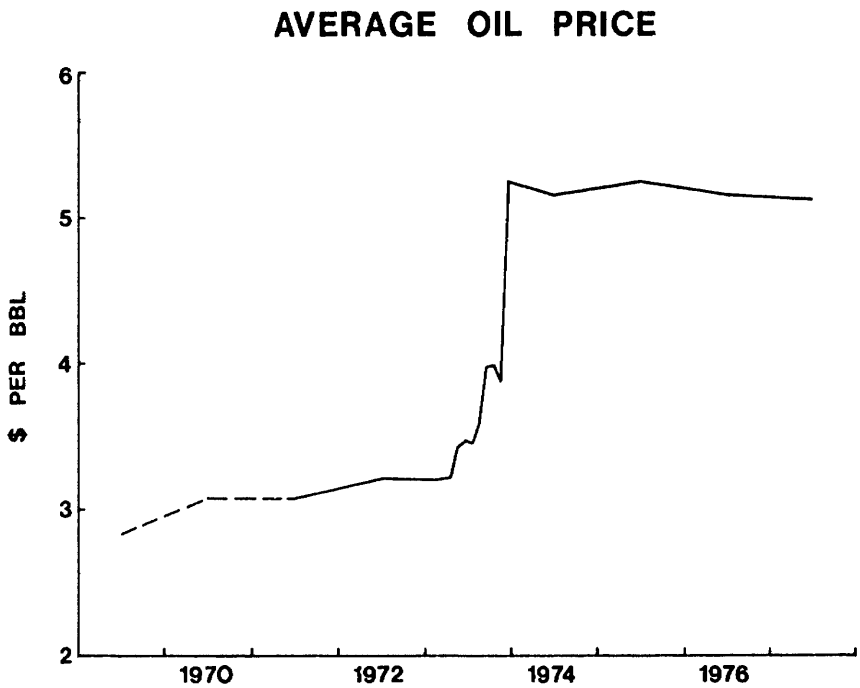
14. McArthur River potential recovery. Higher oil prices will provide incentive to recover more of the field's reserves by stimulating additional drilling and by extending economic producing life. There is potential for recovery of an additional 30 million barrels from tighter layers of the formation that would require new wells producing at much lower rates than the existing wells, and from wells drilled to small isolated "pockets" of oil with limited reserves located in scattered areas around the field.

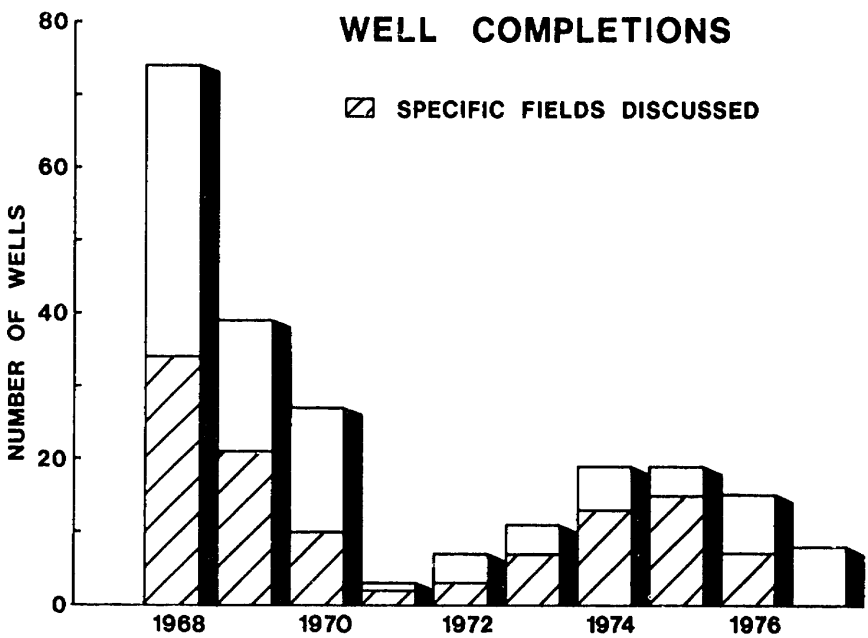
Extension of economic operating life is estimated to add an additional 15 million barrels.

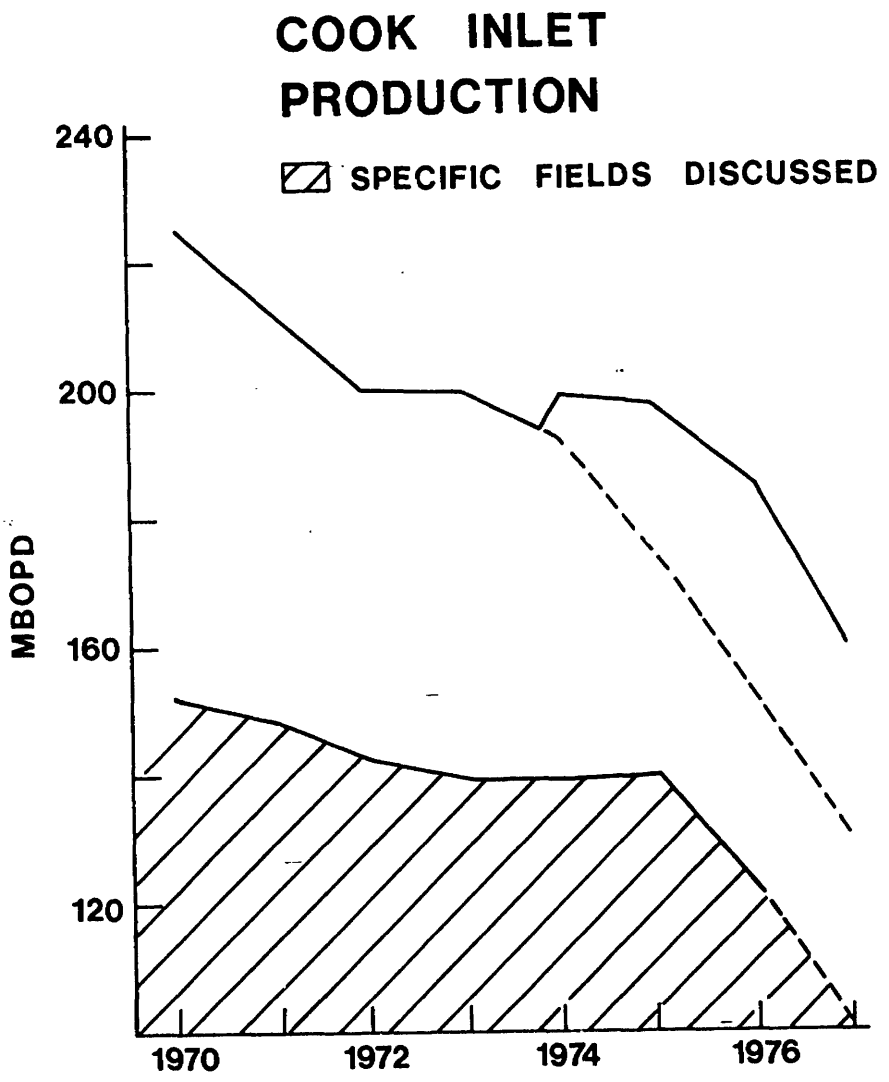
15. Potential recovery from the three fields discussed separately. Potential recovery of about 70 million barrels is estimated for an oil price increase to free market levels. This increase would be split as 40 million barrels from drilling projects and 30 million barrels from extension of economic operations.

16. Potential recovery from Cook Inlet. By extrapolating the data developed for McArthur River, Swanson River and North Trading Bay Fields, we find the estimated additional recovery with free market crude oil prices for all fields in the Cook Inlet Basin is in the range of 100 million barrels.


ANCHORAGE
Knik Arm
Turnagain Arm
AtlanticRichfieldCompany
SOUTH ALASKA DISTRICT
COOK INLET


AVERAGE OIL PRICE
$ PER BBL
6
5
4
3
2
1970
1972
1974
1976


WELL COMPLETIONS
SPECIFIC FIELDS DISCUSSED
NUMBER OF WELLS
80
60
40
20
0
1968
1970
1972
1974
1976


COOK INLET
PRODUCTION
SPECIFIC FIELDS DISCUSSED
MBOPD
240
200
160
120
1970
1972
1974
1976

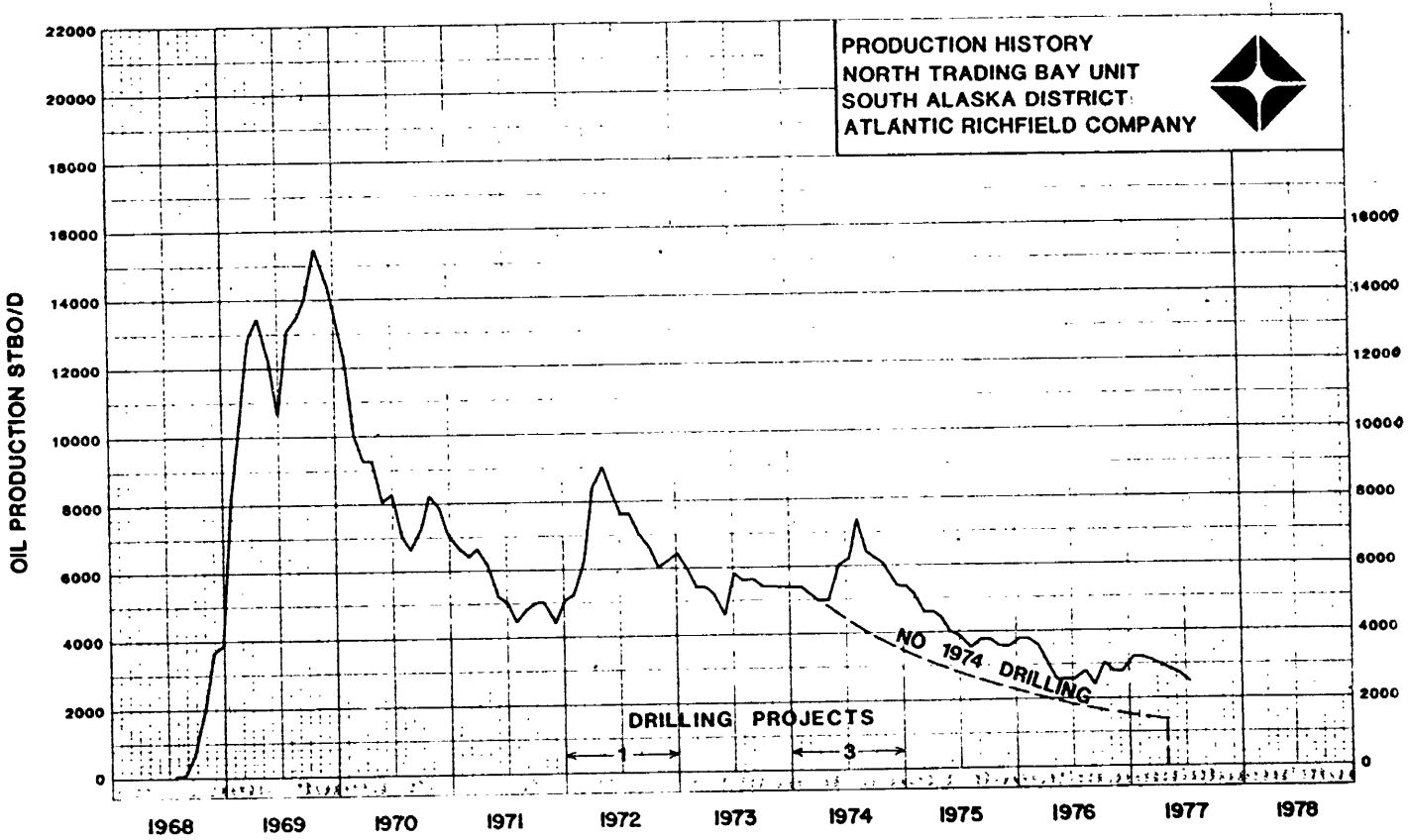
COOK INLET
PROJECTED INCREASED OIL RECOVERY
1974 - 1976 DRILLING

30± MILLION BARRELS - TO 1/78

50± MILLION BARRELS - ULTIMATE

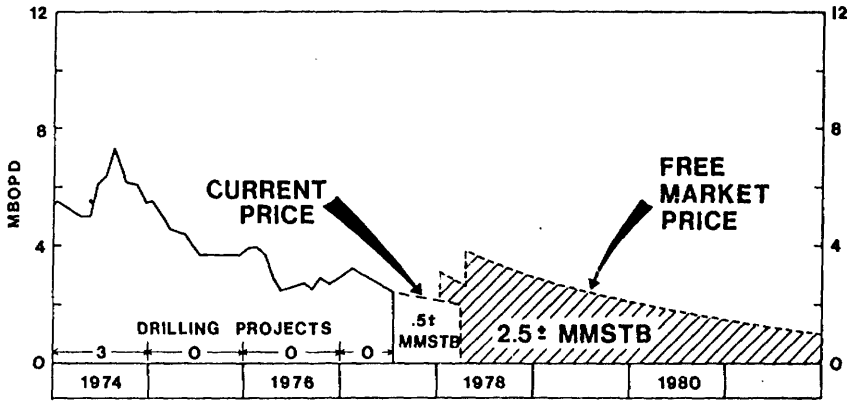
SUMMARY

1. 1973 Oil Price Increases and Subsequent Upper Tier Price Attainment
2. Expanded Drilling Programs 1974-76
3. Production Rate Increase (20,000 B/D Over Estimate)
4. Increased Recovery (30 Million Barrels By 1/78)

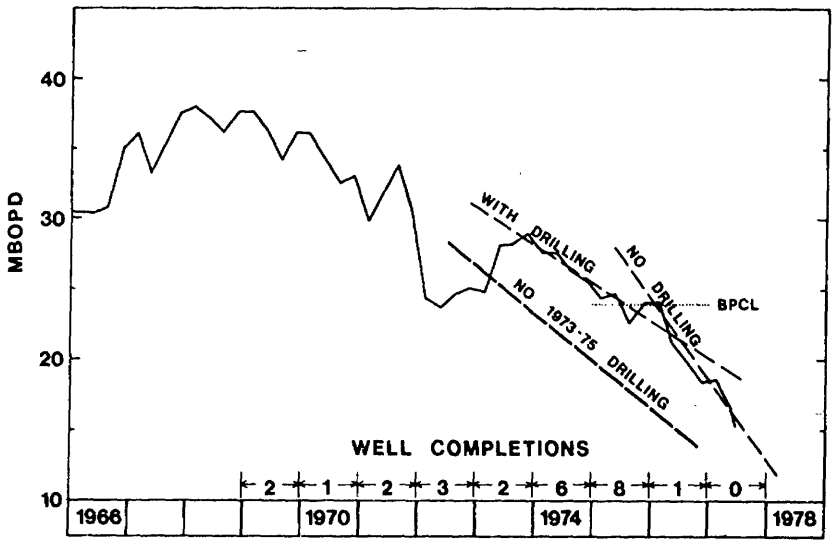

PRODUCTION HISTORY
NORTH TRADING BAY UNIT
SOUTH ALASKA DISTRICT
ATLANTIC RICHFIELD COMPANY
OIL PRODUCTION STBO/D
22000
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
DRILLING PROJECTS
1
3
NO 1974 DRILLING

NORTH TRADING BAY UNIT

PRODUCTION ESTIMATES



SWANSON RIVER FIELD



POTENTIAL WORK WITH FREE MARKET OIL PRICES

SWANSON RIVER OIL FIELD, ALASKA

[NOTE: None of this work is economic at current oil prices]

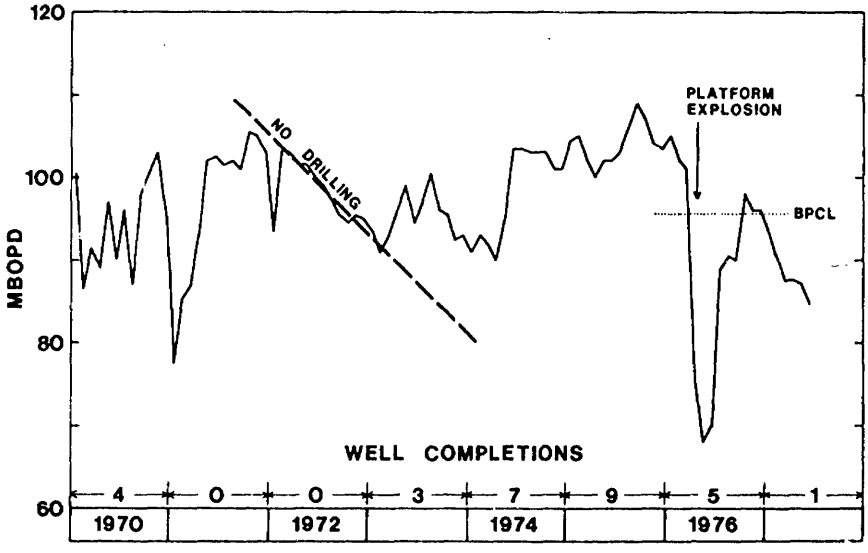
WELL	CURRENT STATUS: HIGH RISK	NOW SHUT-IN	SPING WELL	BAD TUBING	NEED SEGREGATION	NEED NEW SAND FACE	NEEDED WORK: PULL & REPAIR TUBING	REDRILL	ADDITIONAL OIL PRODUCTION (B/D)	ADDITIONAL OIL RESERVES (Bbls.)
1. SCU 12-3	x		x	x	x		x		300	200,000
2. SCU 14-3	x		x	x	x		x		400	300,000
3. SCU 21-3	x		x	x	x		x		300	500,000
4. SCU 23A-3				x			x		500	300,000
5. SCU 21-4	x	x		x	x		x		500	500,000
6. SCU 34-4	x		x		x		x		300	500,000
7. SCU 43-4	x	x		x	x		x		300	200,000
8. SCU 41-5	x				x	x		x	500	400,000
9. SCU 42-5	x	x		x	x		x		400	300,000
10. SCU 21-8	x		x	x	x		x		200	200,000
11. SCU 32-8	x	x		x	x	x		x	500	500,000
12. SCU 32-9	x		x	x	x		x		200	200,000
13. SCU 11-16	x					x		x	500	500,000
14. SCU 21A-16	x					x		x	500	700,000
15. SCU 24-33	x	x		x	x	x		x	500	800,000
16. SCU 34-33				x	x		x		200	200,000
17. SRU 21-15	x	x		x	x		x		400	300,000
18. SRU 43-15	x	x		x	x		x		200	300,000
19. SRU 14-27	x	x				x		x	400	500,000
20. SRU 12-27	x	x		x	x		x		200	200,000
21. SRU 43-28	x	x	x		x		x		200	200,000
22. SRU 34-28	x		x		x		x		200	200,000
23. SRU 32A-33	x	x		x	x		x		300	300,000
24. SRU 41-33	x	x	x		x	x		x	400	500,000
25. SRU 13-34	x	x		x	x		x		300	300,000
TOTAL:							18	7	8,700 B/D	9,100,000 Bbls

IJE/8-77

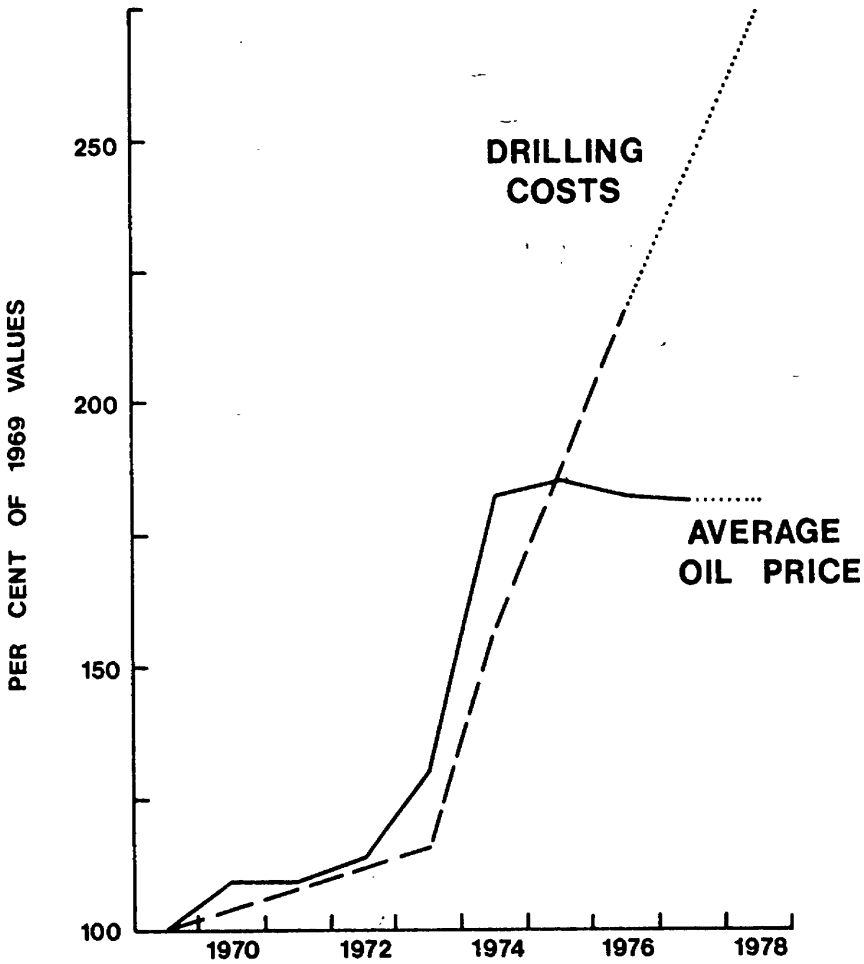
SWANSON RIVER FIELD
POTENTIAL RECOVERY

NEW PROJECTS	9	MILLION BARRELS
EXTENDED ECONOMIC OPERATIONS	15	MILLION BARRELS
	24	MILLION BARRELS

MCARTHUR RIVER FIELD



DRILLING COSTS - OIL PRICE HISTORY



McARTHUR RIVER FIELD
POTENTIAL RECOVERY

NEW PROJECTS	30	MILLION BARRELS
EXTENDED ECONOMIC OPERATIONS	15	MILLION BARRELS
	45	MILLION BARRELS

THREE FIELDS
POTENTIAL RECOVERY

NEW PROJECTS	40 ±	MILLION BARRELS
EXTENDED ECONOMIC OPERATIONS	30 ±	MILLION BARRELS
	70 ±	MILLION BARRELS

COOK INLET
POTENTIAL RECOVERY

100 MILLION BARRELS

SOCIETY OF PETROLEUM ENGINEERS OF AIME—PAPER NO. SPE 5530

Performance of the Hemlock Reservoir—McArthur River Field

(By C. J. Diver, Marathon Oil Co., J. W. Hart, Atlantic Richfield Co., and G. A. Graham, Union Oil Co. of California, Members SPE–AIME)

(Copyright 1975—American Institute of Mining, Metallurgical, and Petroluem Engineers, Inc.)

This paper was prepare for the 50th Annual Fall Meeting of the Society of Petroleum Engineers of AIME, to be held in Dallas, Texas, Sept. 28–Oct. 1, 1975. Permission to copy is restricted to an abstract of not more than 300 words. Illustrations may not be copied. The abstract should contain conspicuous acknowledgment of where and by whom the paper is presented. Publication elsewhere after publication in the Journal of Petroleum Technology or the Society of Petroleum Engineers Journal, is usually granted upon request to the Editor of the appropriate journal provided agreement to give proper credit is made.

Discussion of this paper is invited. Three copies of any discussion should be sent to the Society of Petroleum Engineers office. Such discussions may be presented at the above meeting and, with the paper, may be considered for publication in one of the two SPE magazines.

References and illustrations at end of paper.

ABSTRACT

The pressure maintenance program by water injection in the Hemlock Reservoir of the McArthur River Field—Cook Inlet, Alaska—has been extremely successful. This is one of the largest offshore water injection projects in North America. Constant engineering study and surveillance coupled with an aggressive attitude on the part of the owners has resulted in a program which will maximize productivity and ultimate recovery from the reservoir.

INTRODUCTION

The McArthur River Field is located about 70 miles southwest of Anchorage, Alaska, in Cook Inlet (Fig. 1). The field was discovered in 1965 by the Union-Marathon Grayling Well No. 1–A. The field outline was subsequently delineated by ten additional exploratory wells drilled by four operators over a period of two years.

Current production is 104,000 BOPD from 49 wells which have been drilled from three platforms. Initial oil-in-place was in excess of one billion barrels and cumulative production through June 1975 was about 250 million barrels.

The field was unitized as the Trading Bay Unit in August 1967 before development drilling operations had commenced. A unique feature of the Unit Agreement provided for equity redeterminations at specified intervals. This was a necessary and desirable vehicle to encourage unitization prior to development drilling and recognize subsequent data derived from development drilling. Union Oil Company of California is Unit Operator with Union, Marathon Oil Company and Atlantic Richfield Company as Suboperators for the three drilling and production platforms. The field has been effectively engineered through the Unit Engeering & Planning Group which was formed in 1967 and has taken an active and continuing part in reservoir management throughout the life of the field. Engineering guidance led to the early installation of pressure maintenance facilities and to the installation and subsequent expansion of artificial lift on board the platforms. Engineering evaluation of the field-wide injection pressure maintenance project has been continuous since its inception and engineering study led to the introduction in 1973 of an extremely successful infill drilling program which is still in progress.

FIELD DESCRIPTION

The McArthur River Structure as shown in Fig. 2 is uncomplicated and composed of two anticlines with an intervening syncline forming one major structural trap. Approximately 900 feet of closure exists on this structure. A crestal apex of the major anticline occurs in Sec. 28, T9N, R13W. The dominant axis trends N10°W. Flank dips in the field vary from 6°–8° on the east and up to 20° on the west.

The major Trading Bay Fault establishes the northwest limit of the McArthur River structural trap. This fault is a large thrust fault with possible lateral northeast movement of the separate up-thrown Trading Bay Field area. A normal fault striking N96°W occurs in the southwest part of the structure in beds above the Hemlock Formation.

The sediments in McArthur River Field are comprised of several hundred feet of Recent to Quaternary fluvio-glacial gravels and clays underlain by about 10,500 feet of non-marine Tertiary Kenai Group sediments comprised of lenticular, often discontinuous, units of sandstone, conglomerate siltstones and claystones. These Tertiary sediments are underlain unconformably by an unknown thickness of Lower Jurassic Talkeetna Formation volcanics and metasediments. Part of the lower Unit of the Kenai Group, the Hemlock Formation, Oligocene in age, is a clayey to sandy, pebble to boulder conglomerate, interbedded with pebbly sandstone, minor siltstone and occasional coal.

The Hemlock Formation in this field has a gross thickness of approximately 500 feet. There are six main intervals of layers separated by impervious siltstones which exist over the entire structure. A typical log illustrating this layering is shown in Fig. 3. The quantity of mixed silt and clay varies with lithology averaging about 12 percent in the sandstones and about 16 percent in the conglomerates. Net effective section varies from 300 to 425 feet in thickness. Permeability measurements vary with lithology and structural position but average 125 md. on the crest of the structure degrading to 25 md. on the flanks. Several core samples were subjected to 2500 psi frame pressure and porosity value corrections applied to the remainder of the core values. The predominately sand samples have an average porosity of approximately 12.5 percent while the more conglomeratic samples average 9.5 percent. The average weighted porosity is estimated to be 10.5 percent. Original water saturation estimates vary from 35–40 percent.

The Hemlock produces a 35° API paraffinic crude. At original reservoir conditions of temperature and pressure, the solution GOR was 309 cubic feet per barrel resulting in a formation volume factor of 1.186. Viscosity of the saturated crude at reservoir temperature of 185°F. is 1 cp. The bubble point has been measured at 1790 psia or nearly 2500 psia less than the original reservoir pressure indicating the highly undersaturated condition of the system. Laboratory data shows no variation of crude analysis either vertically or horizontally throughout the field.

The interstitial water has a salinity of approximately 24,000 ppm and contains practically no barium or strontium. At reservoir conditions this water has a viscosity of 0.35 cp.

EARLY PERFORMANCE

The field has been developed from three platforms with two drilling rigs on each of the platforms. These platforms have operated successfully in the harsh Cook Inlet environment where tides fluctuate by up to 35 feet, currents run as high as 8 knots and ice floes can form up to 4 feet thick. They have withstood a 5.9 magnitude earthquate in 1968 centered only 60 miles away. Development drilling operations commenced in the last half of 1967. Analysis of the drill stem test data from the exploratory wells provided some clue as to what should be expected. However, it was not until the first development well was completed that the true quality of the field was fully appreciated. The first wells were drilled on the crest of the field so these early wells for the most part encountered a full section of pay above the oil-water contact. The combination of thickness, permeability and favorable viscosity resulted in PI's in the range of 5 to 10 and initial production rates of up to 8,000 BOPD. This high rate of production was somewhat of a surprise since wells in other fields in the Cook Inlet completed prior to 1968 were producing at average rates in the 1,500 BOPD range.

Within eight months the field rate increased to 70,000 BOPD (Fig. 4). Platform production facilities became fully loaded almost immediately requiring rapid expansion of flow lines and headers, separation equipment, and shipping facilities. Reservoir pressure declined rapidly due to the under saturated crude and the lack of any substantial natural water drive. The declining reservoir pressure required the installation of artificial lift equipment earlier than had been anticipated leading to further platform construction activity during the development drilling phase.

As a result of the high withdrawal rates and rapidly declining pressure, engineering studies were instituted to cope with the attendant problems. To maintain producing rates, artificial lift methods had to be designed; and to combat the pressure drop, some means of pressure maintenance was necessary.

ARTIFICIAL LIFT

Although initial wells produced at rates in excess of 8,000 BOPD, the rapidly declining bottom hole pressure required that artificial lift be installed very early in order to maintain productivity. Several alternate methods of lift were considered but it was apparent that gas lift was best suited, at least for some initial period. The low formation gas-oil ratio (300:1), the deep lift (9,000'+), and the high volume of mostly clean oil production represented an almost ideal condition for gas lift. Other methods of lift have been studied periodically but it appears at this time that gas lift is still the most efficient lifting mechanism and will continue to be for the foreseeable future. Expansion of the gas compression facilities on board the platforms is still taking place. Depending on platform produced fluid rate, compression horsepower varies from 7,500 to 13,500.

PRESSURE MAINTENANCE

Reservoir performance of other fields in Cook Inlet Basin indicated insufficient voidage replacement by natural aquifer expansion. A primary depletion study on McArthur River, prior to the start of development drilling, indicated that without water influx oil recovery would be quite low, producing rates would decline rapidly, and the field life would be extended over a long time. This study and other early studies have been described previously.[1]

The results of the primary depletion study led directly into comprehensive study of the alternatives for pressure maintenance. This work effort was accelerated by the completion of the first development wells in late 1967 at the 8,000 BOPD oil rates. A comprehensive program for reservoir pressure data gathering was implemented from the outset and these data confirmed the anticipated rapid pressure decline. This data showed that in February 1968, only three months after initial production, a pressure drop of 200 psi had taken place in the major portion of the field.

In January 1968, the Engineering & Planning Group completed the first of a series of pressure maintenance evaluation studies. This first study recommended that design of water flood facilities commence immediately for all three platforms and that a well be drilled on the periphery of the reservoir in order to conduct water injection tests. A month later the group completed an investigation of gas injection as another means of pressure maintenance. The volume of gas required exceeded any known available supply and it was concluded that water injection was the only feasible method to employ. These recommendations were rapidly implemented and in May 1968 a water injectivity test in Well K-6 confirmed laboratory data that filtered Cook Inlet water could be injected into the reservoir without detrimental effects. On subsequent tests, injection rates up to 30,000 BWPD were established at surface pressures of 3,000 to 3,500 psi in this well. In June 1968, immediately following the successful injection test, water injection plants were ordered for the three platforms.

Having decided on water injection as the means for pressure maintenance, the next engineering problem was the selection of a pattern. Five-spot and inverted nine-spot patterns were studied. However, a major disadvantage was the requirement to convert several high productivity wells on the crest of the structure which would have resulted in a substantial reduction in field rate. As an alternative it was decided to start out injecting into the peripheral wells of the inverted nine-spot pattern to evaluate the effectiveness of flank injection. Even though individual well injectivities were somewhat less on the average than those in the test well, sufficient water was injected to cause a pressure response in crestal producers almost two miles away. With one exception, all water injection to date has been into wells located on the periphery of the field.

In early 1969, full scale water injection commenced (Fig. 4). Construction of the plants continued through 1969 and by mid-1970, the total injection rate was 120,000 BWPD, about the volume required to replace voidage. After expansion and modification of the plants, total injection reached 170,000 BPD in 1971 and has been maintained at this level. Because of the large volume of water required, the

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See References, p. 1492.

only reasonable water source was Cook Inlet, a very dirty, glacial silt laden body of water. The water is deaerated in a vacuum or stripping tower. All platforms utilize upflow sand filters with upstream injection of a flocculating agent. This type filter has been used for industrial purposes along the Mississippi River, but this was the first time they were used for an oil field water treatment plant. On two platforms diatomaceous earth filters are employed to reduce the solids content to less than 1 ppm.

Water pumping is by gas turbine-driven centrifugal pumps operating at pressures from 3,000 to 4,500 psi. Injectivity into flank wells in the southern part of the reservoir was not as high as the wells on the north flank so the higher pressures are required on the southern-most platform.

In late 1969, before balance between injection and production was achieved, the field-wide average pressure was calculated to be 2,850 psi representing a pressure drop of about 1,400 psi. Cumulative production at this time was 53.5 million barrels of oil. Measured pressures revealed even lower pressures in the south-central portion of the field as shown in Fig. 5. Pressures as low as 2,400 psi were measured in this area. The low injection rates in the east and southern flank wells were insufficient to offset the large withdrawal rates of the crestal wells. This prompted studies to evaluate a modification of the injection pattern to achieve more injection if the rate could not be increased in the existing wells. Two significant problems with the water flood project were recognized, (1) a lack of sufficient injection rate, and (2) unacceptable vertical distribution of the injected fluid. To deal with this, a major injection well stimulation program was undertaken. The objective was to achieve improved vertical water distribution through large volume mud-acid stimulation treatments of the injection wells while at the same time gaining a substantial increase in overall injection rates. The procedure for these stimulation treatments has been detailed in another paper.[3] Results were good in some wells. Profile improvement did result in increased injection rates. However, the full effects were not realized until facility expansions were completed on the platforms.

During this time, casing parted in an injection well near the low pressure area and it was recommended the well be redrilled to a somewhat in-field location. This was an attempt to locate the well in a more permeable section of the reservoir closer to the low pressure area. The success of this decision was confirmed when the new well was completed at an initial injection rate of 16,000 BPD, a 9,000 BPD increase from the original well. A near ideal injection profile was achieved in this interior well after acidizing.

The nearly simultaneous events of successful workovers and relocation of a key injection well resulted in a more uniform vertical and areal distribution of injected water.

After we began injecting volumes substantially in excess of reservoir voidage in 1971, the pressure decline throughout the field was reversed. The pressure distribution in January 1973 is illustrated in Fig. 6. Since that time the average pressure has been steadily increasing. The low pressure area in the south-central portion of the field still remains. This is felt to be a result of the lack of reservoir continuity or minor faulting along this flank of the field. Injection into one or two wells on the west flank is only partially if at all effective. The conversion of one producer and the relocation of one injector are currently under study as a means of solving this problem.

In 1974, a flank well that was producing a low fluid rate with a high water cut was redrilled to a new bottom hole location only 100 feet away from the original hole. The purpose of this was two-fold. We wanted to see if we could reestablish commercial production in a watered out well by redrilling. Because of the heterogeneous nature of the reservoir, the possibility of bypassing large volumes of oil in less permeable zones was of major concern. Secondarily, we wanted to evaluate the extent to which the reservoir had been flooded vertically in this part of the field.

Our primary objective was only partially successful. The well produced only 1,000 BOPD with less than 5 percent water cut from the redrilled completion. However, the new logs indicated much better vertical sweep than we had anticipated. Most of the lower sand sections appeared to have been swept by the injected water. Log analysis indicated some 150 feet of reservoir with water saturation changes of about 25 to 30 percent. Approximately 35 feet of more shaley interval indicated about 0–10 percent change in water saturation. Vertical conformance from this data is estimated at 80 percent.

It is clear now that the reservoir response to water flooding has been exceptional. Prior to full implementation of the flood, pressure was declining through-

See References, p. 1492.

out the reservoir with a corresponding steep decline rate for the individual producing wells.

Success of the water flood project is attributed to several factors:

1. The vertical conformance of water injected into the reservoir appears to be exceptionally good.
2. Displacement efficiency is high.
3. Pressure transmissibility over long distances across the reservoir has been good.
4. Pressure has been maintained above the bubble point throughout the reservoir.
5. There is an absence of significant "thief" zones common to many water injection projects.

PRODUCTION WELL STIMULATION

Two workover techniques have been employed to restore productivity in the field.

To-date three successful matrix acid stimulations have been performed resulting in productivity increases of two to three fold. One job failed as a result of the acid breaking by the primary cement and stimulating a water bearing interval.

Reperforating under drawdown conditions has proven to be a satisfactory technique for stimulation. A drop in productivity was first measured as a reduction of transmissibility on pressure buildup analysis. Later, production logs indicated sections of the well not contributing any fluid. It was these intervals which were initially reperforated with marked success. It is surmised that some fines in the matrix plug existing perforations as a result of the movement of large quantities of fluid into the well bores. With cumulative fluid production from 4 to 11 million barrels per well, only a minor amount of solid material per barrel can result in significant quantities of solids being transported. This productivity loss is the subject of considerable study at the present time.

RECOMPLETIONS

The common problem of the proper water cut at which to shutin producing wells in a peripheral injection project is present in a unique form in the McArthur River Hemlock. Because of a rather flat oil-water contact, the areal extent of the lower layers is considerably less than in the upper sections. Water encroachment and high injection rates in these lower layers have caused water production to occur there first. With the beginning of water production, we have observed an abnormal decline in well productivity. This decline is in excess of that attributable to less effective gas lift and saturation changes in the water productive layers. Production log data showed in many instances a marked drop in oil rate from the water-free sand members. Therefore, we had two reasons for eliminating these water producing intervals in the lower structure wells; (1) retaining reservoir energy for up-structure withdrawal points and (2) prevent loss of recovery by restoring productivity to the water-free layers. Simple cement squeezes below a retainer where the primary cement job was suspect or setting a bridge plug have both been successful in eliminating the water production. By shutting off this water production, we have successfully restored the oil producing rate from upper layers in nine such wells.

The water cut at which these plug-backs are performed is more a function of the drop in upper layer productivity than other considerations.

INFILL DRILLING

In late 1971 and continuing through 1972, a decline in production rate was apparent as shown in Fig. 7. The field was developed on essentially 160-acre spacing. Early studies had indicated that there might be areas of the reservoir left unswept without additional drilling. To evaluate this potential and attempt to restore production rate, in 1973 the first infill wells were drilled on 80-acre spacing. These wells were completed with a different technique than that originally employed in the field. In the initial drilling phase, perforating either through tubing or with casing guns, was accomplished by shooting the entire interval to be opened and then placing the well on production. Beginning in 1973, the wells have been perforated through tubing under drawdown conditions. Intervals which are indicated from open hole log analysis to have poorest rock properties are perforated first and "cleaned up." A differential pressure of approximately 1,000 psi is maintained while perforating these intervals. The better rock is not shot until production has been established from these lower quality intervals. As a result, we have been able to establish good rates of production from

layers that were apparently not producing from the earlier wells. While successful economically, these well did not achieve the reservoir control we felt would be necessary to maximize ultimate recovery. In 1974, we modified the program so that the new wells were perforated in only the lower sand members where we had nearly restored original reservoir pressure. The first well in this modified program was drilled in an area offsetting wells which had had these layers cement squeezed to shut off water production as discussed under workovers. This well was completed for an initial rate of 6,000 BOPD flowing. It has produced a total of just over 2,000,000 barrels in 12 months and is currently producing 4,000 BOPD with a 24 percent water cut. Two more wells were drilled in 1974 and were completed in the same manner with similar results.

As shown in Fig. 7, there is a substantial increase in oil rate resulting from this drilling program over that established by the decline which started in 1971. Field rates are at or near all time highs. We expect the average production for 1975 to exceed 100,000 BPD for the first time in the field's history. Through June 1975 cumulative oil production from the infill wells amounts to over 12 million barrels and the current production rate from these wells is nearly 40,000 barrels per day.

Additional locations remain to be drilled and the plan is to complete the current program in 1976.

RECOVERY

Fig. 8 demonstrates the effect on recovery by the various workover and drilling schemes employed in McArthur River Field.

The displacement of the curve toward higher ultimate recovery at the same WOR shows the benefits derived. The slope of the WOR versus cumulative base curve established in 1970 has remained constant with each procedure employed.

In 1971 and 1972 the major effort was on workovers and recompletions. Starting in 1973 and continuing again in 1974 the infill drilling program has drastically displaced the curve.

Because of these successes we expect to recover an additional 50 to 80 million barrels of oil. By proper layer management, even with a relatively limited number of wells, we have been able to recover over 50 percent of the ultimate reserves at a water cut only now up to 17 percent.

Recovery through June 1975 is some 248.4 million barrels. Cumulative injection total 308 million barrels or approximately 20 percent of the pore volume.

CONCLUSIONS

1. Pressure maintenance early in the life of the field has served to stabilize producing rates. A unitized operation with an engineering committee working essentially full time in the early development provided a means for rapid response to the highly accelerated pressure decline.
2. Pressure response to injection has been measured with injection wells drilled up to a mile from the nearest producer and over two miles from the crest of the field.
3. The field has and is performing remarkably close to theoretical analysis.
4. In a layered reservoir with limited wells careful planning of completion intervals will result in additional recovery.

ACKNOWLEDGEMENTS

The authors wish to thank the managements of Marathon Oil Company, Union Oil Company of California, and Atlantic Richfield Company for permission to publish this paper.

Thanks are also due the many technical people in the owner company organizations who have been involved in Trading Bay Unit Engineering studies.

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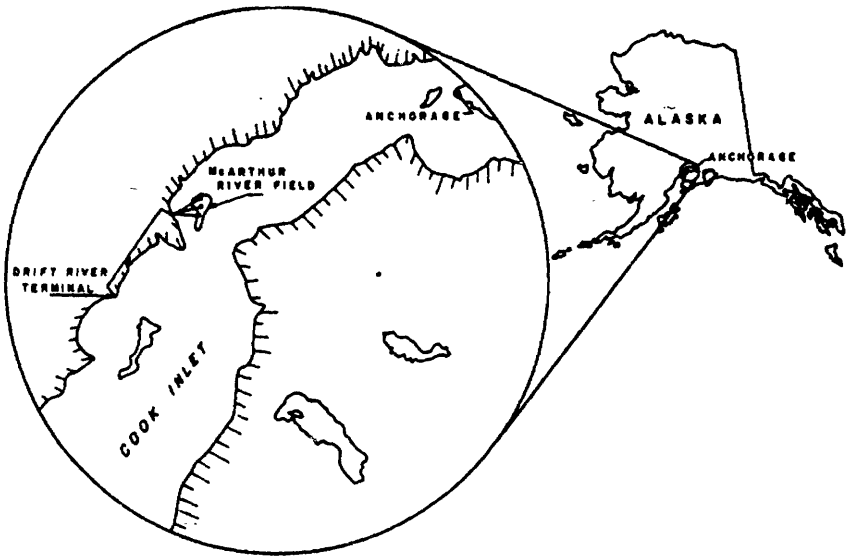

FIGURE 1.—McArthur River field location-Cook Inlet, Alaska.

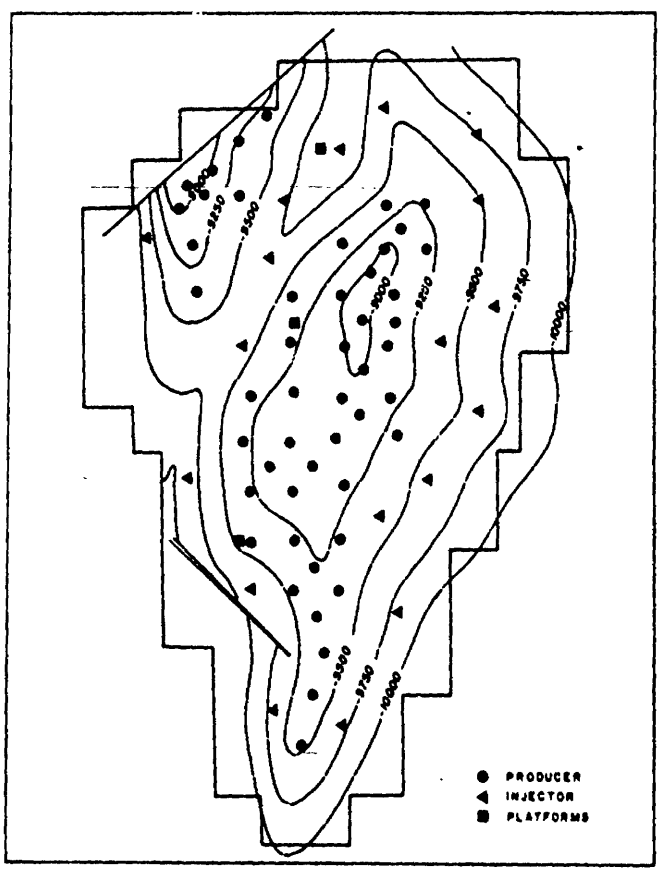

FIGURE 2.—Top of hemlock formation, June 1975, McArthur River field.

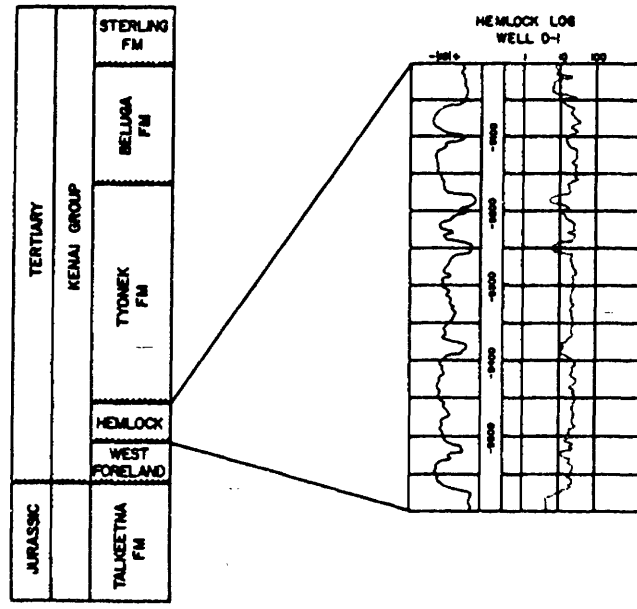

FIGURE 3.—Generalized geologic section and type log—McArthur River field.

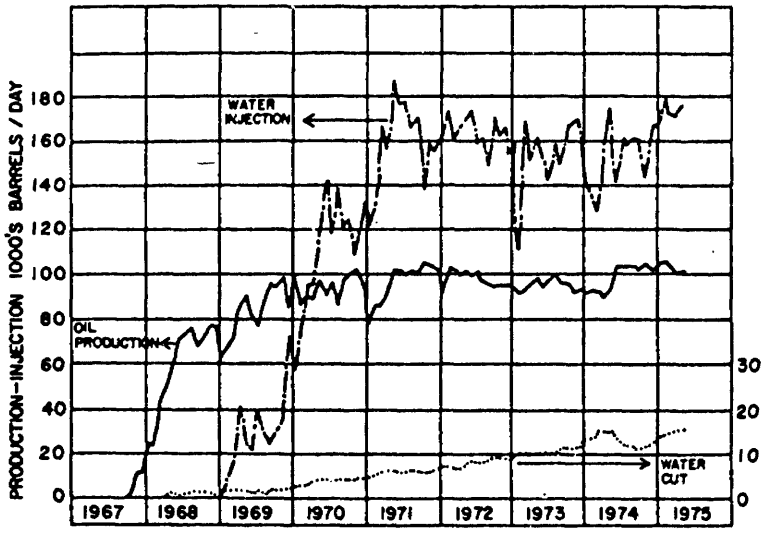

FIGURE 4.—Production and injection history, McArthur River field.

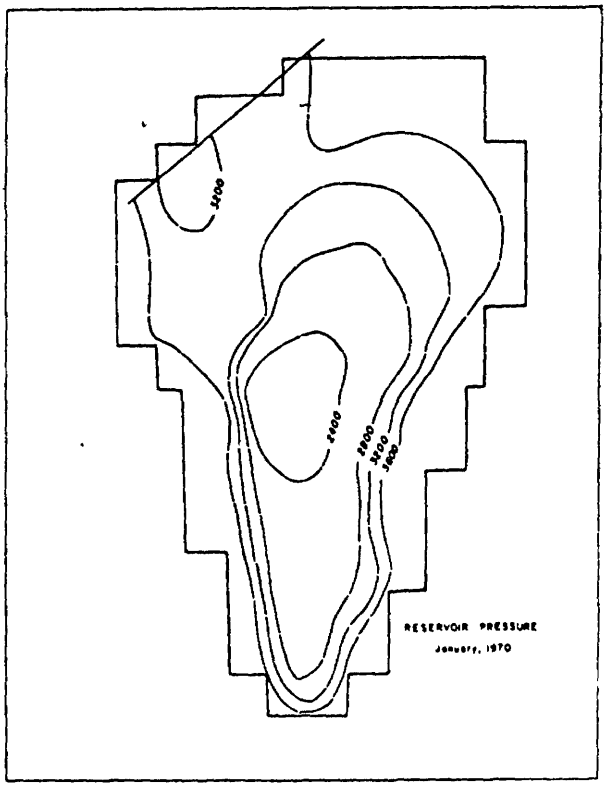

FIGURE 5.—Reservoir pressure map—January 1970.

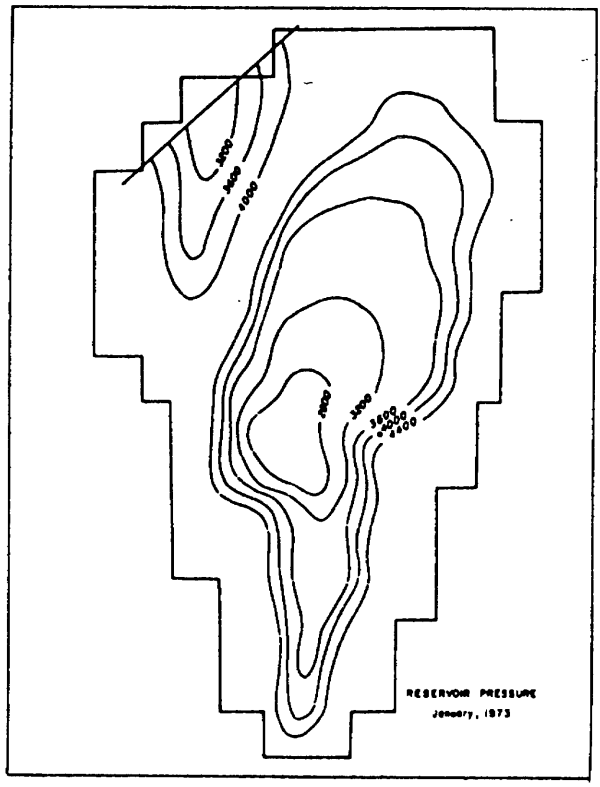

FIGURE 6.—Reservoir pressure map—January 1973.

FIGURE 7.—Effect of infill drilling program, McArthur River field.

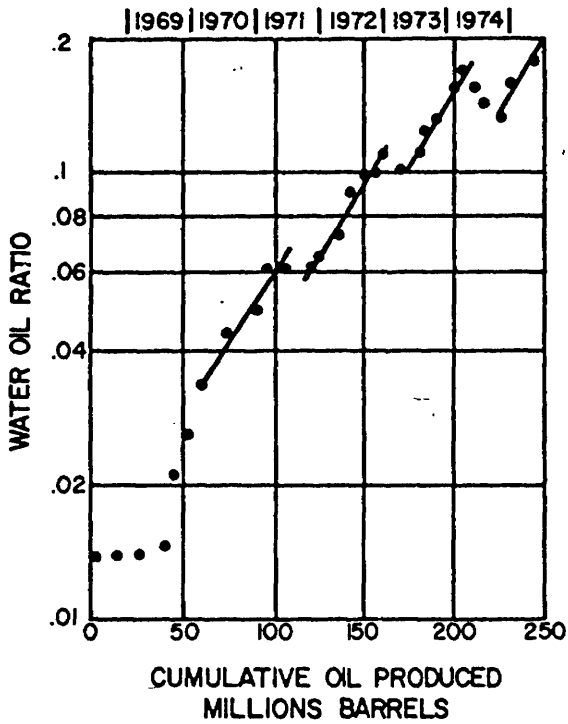

FIGURE 8.—Change of water-oil ratio vs. recovery with various programs, McArthur River field.

Senator GRAVEL. Let me get to your next point which was a policy of continuation. This is a policy of continuation. You talk of Government control. I don't think you can get away with the rhetoric of saying you are not controlling. The oil industry is controlled right down to the gnat's eyeball. And this program that you have is a continuation of that. You may have your philosophical reasons for doing this. I don't fault you for that. I just happen to think those are in error, and I say that most respectfully.

So with all the rhetoric you produce you come to one thing, what is the report card at the end of the year? What has been the report card for the end of the year for the last 4 years? That report card shows there has been an increase in imported oil so, in my mind, while the rhetoric is very attractive, I can only judge the final results —which is what we judge this Nation on, results—we are deeper in trouble. I think I can only add to that the statement—because I think we are in a philosophical disagreement—that I think the proof of the pudding is what the results are. And the results have been clear to all of us for the last 4 years. I think we are floundering on our inability to get out of it. I repeat the statement I made to the President at a meeting recently. That was, "Hang tough, we are going to have a chance to focus on this problem 2 years from now and 4 years from now." But you can't beat an administered price from a cartel with an

administered price at home when you don't permit the money to go back to beat them in production.

The only way to beat the cartel is to produce American oil and gas in sufficient quantities to meet the needs of energy.

Secretary SCHLESINGER. The capacity of the United States to produce oil is limited. In the national energy plan we aspire by 1985 to be producing at one-half million barrels a day. It is for that reason that we provide the world oil price for new oil. That will take a lot of doing to get there. We are going to be importing 6, 7, or 8 million barrels a day depending on which version of the House bill you would take. In 1985, in the longer run, we are going to run out of oil. Oil has peaked in the Lower 48. It has not as yet peaked in Alaska.

In the case of Alaska and the oil that is flowing from the North Slope, we have provided the world oil price. We were criticized for that. You cannot do better than the world oil price. The cost of transportation from the North Slope is $6 to $7. That knocks down the wellhead price.

We think the producers on the North Slope should have a substantial rate of return and that is why we went to the world oil price as the criterion for the North Slope.

Now, as to profitability of those companies. If you examine the historic trends, profits have risen dramatically, and that is a good thing. They have doubled in the past 4 years. Their performance exceeds that of other companies listed on the stock exchanges.

Senator GRAVEL. Return on capital is not how I judge profits. Are you telling me return on capital for the oil industry has doubled in the last 4 years?

Secretary SCHLESINGER. No, sir, I told you aggregate profits have doubled in the last 4 years. As for the return on capital, we discussed earlier what Congress can do and Congress cannot do. The opportunities that the oil companies have for hiding profits and disguising profits exceed the opportunities available to other organizations.

Senator GRAVEL. Mr. Schlesinger, that is a statement that has been very often made by a lot of people. I would like to have some documentation from the Department of Energy as to how the oil companies are specifically making excessive profits and hiding them. I know how an individual can keep quarters in the basement to keep it from the Government, but I do know we have a free market, relatively free market and the final arbiter of that market is essentially the community of Wall Street. If all these profits are supposedly being made, why isn't there a rush to buy all these oil stocks so they can enjoy these unusual profits? So I think there comes a time when this has to be documented for the record and I think you have the organization to do it.

I think what we should do is have for the record exactly what the excessive profits are, made by what companies, and how they are disguising this from the public. I make that as a very official request so this committee can be privileged to have that. And if I am wrong, I would like to know it because I hate to keep making statements that the profits are no more than what average manufacturing profits are in the country. Either I am totally misinformed or you have information that we have not been privy to and I think I would like to

see it. I have asked other people from other committees who made the similar charge and it has never been brought forward for the record, so I think it is time we bring it forward.

Secretary SCHLESINGER. I will be delighted to do that, Senator. Let me make two observations, however.

[The following was subsequently supplied for the record:]

OIL COMPANY PROFITS

Question. Senator Gravel of Alaska has made a request of the Department of Energy to provide, for the record, documentation of oil industry excessive profits and how they are disguising this fact from the public.

Answer. Oil companies are permitted to write-off immediately for tax purposes certain expenditures which other kinds of companies must capitalize and amortize over time. The most significant example of an expenditure which falls into this category is intangible drilling costs. The fact that these expenditures may be directly charged off to current income serves to reduce the profits which are reported by oil companies. If, on the other hand, oil companies were required to capitalize these items over a long period of time, rather than expend them immediately, their reported profits would be higher.

The question of excessive oil industry profits has been raised in the context of whether the industry has sufficient capital resources for domestic exploration and development. Our analysis of cash flow and capital expenditures forecasts for domestic production activities illustrates that sufficient capital is raised by these activities to fund capital requirements. And, there is no clear reason why cash flow from domestic production activities should finance not only domestic exploration and development but also any other domestic and world-wide endeavor of major oil companies.

Historically, cash flows from domestic production activities have exceeded domestic exploration and development capital expenditures; our forecasts illustrate that this will continue into the future.

	1973	1974	1975	1978	1979	1980
Net cash flow from operations	6.2	9.9	10.2	14.1	15.6	17.3
Capital expenditures	5.3	8.9	7.0	9.6	10.8	11.5
Excess of cash flow over capital expenditures	.9	1.0	3.2	4.5	4.8	5.8

The implication of these figures is confirmed by the statements of industry spokesmen. For example, the August 15 issue of Forbes magazine quotes Exxon President Howard D. Kaufman as saying that Exxon is suffering ". . . not lack of cash, but lack of opportunity." Exxon's Chairman has been quoted as saying that if Exxon can't invest outside of oil and gas, one alternative would be to ". . . take the cash flow that is coming in from current successful kinds of investments and give it back to our stockholders."

Also recent non-energy acquisitions by major oil companies such as Mobil's acquisition of MARCOR or ARCO's acquisition of Anaconda indicate that cash flow for oil and gas exploration is adequate.

A comparison of domestic production cash flow with the financial statistics reported by oil companies for their world-wide consolidated business, illustrates that certain other of their lines of business do not achieve returns as high as does domestic production. These less profitable areas of endeavors inevitably must decrease consolidated returns. Since oil company stocks are offered only on a consolidated basis, Wall Street is correct in reacting to consolidated financial rather than data for a particular portion of the oil industry's total endeavor.

Finally, there is no evidence that the financial health of the oil industry has been downgraded. As to bond ratings, we have examined the July 1977 Standard and Poor Ratings for 32 petroleum companies, and half of the firms had A plus or better. Another 9 had A ratings. Only 7 had B or BBB. All the majors were AAA except for Texaco, which had a AA plus rating.

Marathon has dropped to an A plus rating. Texaco also declined from AAA to AA plus since December 1973.

However, since December 1973, Kerr McGee went from BBB to AA. Occidental went from B to BBB. SOHIO from AA minus to AA. Texas Oil and Gas went from A to A plus. All other firms remained constant.

DEPARTMENT OF ENERGY ESTIMATES OF IMPACT OF TAX INITIATIVES PROPOSED BY SENATE FINANCE COMMITTEE STAFF (PT. 3)—Continued

Fuel category	Incentive	Production or savings accounted for earlier 1985 (barrels per day)	Additional impact of proposed incentive (barrels per day)	Annualized 1985 revenue loss or outlay (dollars per barrel)	Revenue loss 1980–85 (million dollars)
Credit for alternative fuels, property credits and paper amortization.	The combined impact of these incentives would be extremely strong. We would estimate that these proposals could result in conversions from oil and gas to coal and other substances approximately 1–1.6 MMBDE. The limiting factor would be availability of equipment and engineering manpower to construct the facilities. Revenue impact of the credit for alternate fuels would be in the range $8,000,000,000 to $10,000,000,000 over the period 1977–85. The revenue impact of the property credit would range from $5,000,000,000 to $7,000,000,000 over the 1977–85 period.				

Secretary SCHLESINGER. First, that is a statement I have not made before. I make it on this occasion.

Second, I said no word about excessive profits. I did say oil companies have the opportunity to legitimate expense items that other businesses cannot do and that they can control.

Senator GRAVEL. That should make them more profitable than other businesses, should it not?

Secretary SCHLESINGER. Oh, no.

Senator GRAVEL. Then we are not doing them any favors if they are just as profitable as any one else.

Secretary SCHLESINGER. You mean in real terms they are more profitable, yes; yes, precisely that. That is the thrust of my comments. I noticed in the Oil Daily the advice from Wall Street. "Pretty attractive price." I don't know why the public is not going out and buying the stocks.

Senator GRAVEL. Maybe the public is making an informed judgment. There are, one, no excess profits and, two, it is not such a good deal.

Secretary SCHLESINGER. Or maybe they don't see the real advantages.

Senator GRAVEL. That is why I hope you come forward with some information to show us where they are hiding their profits, because that was the statement you just made a while ago, they are hiding these profits. We don't see them. I would like to see how they are doing that because I would like to correct it if I can or not be party to a lie or fraud on the Government.

Secretary SCHLESINGER. This is not a fraud on the part of the Government. The Congress presumably established the rules by which oil companies can expense items as a matter of deliberate policy. It is not therefore a fraud or a lie.

Senator GRAVEL. Mr. Secretary, I think it is fair to say here I am making a statement about the profitability of oil companies or what is going on and your retort to me is that they are making profits and it is not understood or it is not seen. I reply to you that I have documentation that shows they are not as good as average manufacturers, and you tell me they have all kinds of incentives to go ahead and do great things for energy. At the end of the year we find out we are getting deeper and deeper in trouble in our energy supplies. Maybe

some day we will find out what we have is a real bureaucratic hoax being done and we are missing it all and we would be better off with a free market.

Secretary SCHLESINGER. That is very unlikely, Senator. It would be a fraud on the American people to suggest that there is not a true oil problem out there, that the United States is not going to be able to keep producing 18 or 19 million barrels of oil a year, and that we will not have to adjust our pattern of consumption.

Senator GRAVEL. I never faulted the conservation approach. I think that is very sound. I think it had a free market price.

Barry Commoner said the fault of this administration is the writing off of oil and gas. You just confirmed it in my mind by making a statement that oil and gas is not going to do it in the immediate future. So, therefore, you've got yourself a self-fulfilling prophecy and I know you don't intend to do this, but the product of government regulations is to guarantee that that prophecy is fulfilled.

I think we can wait until the end of next year to see we will be more and more dependent on foreign interests.

Secretary SCHLESINGER. I trust the Government policy will recognize the realities of geology and not pretend that they do not exist.

Senator GRAVEL. The realities of geology and that the industry has proven time and time again if you dig a hole and you find there is oil there—you will never know if oil is there until you dig a hole, but if you take away the ability for them to dig the holes because there is no profitability in them digging holes, you will never find out.

Secretary SCHLESINGER. Unfortunately this industry indicates that worldwide we are going to peak out in terms of oil production. Here is a pamphlet from Mobil Oil, for example. It does not necessarily say the same thing that newspaper advertisements say, but it states that perhaps as early as around 1990, "The free world will no longer be able to increase petroleum production. This dramatizes the urgency of conservation along with the development of both conventional and alternative energy sources."

You have the same thing from every other responsible oil company. It is what responsible geologists say. We would be kidding the American people if we were to suggest that we are not going to run out of oil and that there is some great resource out there to be tapped readily.

Senator GRAVEL. Mr. Secretary, we are going to run out of oil. I think that is a statement of the obvious. The question is, are we going to fail to look for the oil that is there to save this Nation from a foreign dependency—and I submit the present policy does not do that—and my first question was do you have evidence why we should change, why we should continue. I have not seen that evidence.

[The following was received for the record from Mr. Herman J. Schmidt, vice chairman of the board, Mobil Oil Corp.:]

MOBIL OIL CORP.,
New York, N.Y., September 23, 1977.

Hon. MIKE GRAVEL,
U.S. Senate,
Washington, D.C.

DEAR SENATOR GRAVEL: We are concerned to note that, in a discussion with you in a Senate Finance Committee hearing on September 15, Energy Secretary James R. Schlesinger quoted a Mobil pamphlet in a way that seriously distorted

our views on the potential for discovery of new oil and gas reserves in the United States. If uncorrected, Mr. Schlesinger's remarks could be highly misleading to the committee.

Mr. Schlesinger quoted correctly from a Mobil pamphlet entitled "Public Policy and Energy," which is a reprint of remarks I made before the Los Angeles Society of Financial Analysts on February 28, 1977. The quote was: "Perhaps as early as around 1990, the Free World will no longer be able to increase petroleum production. This dramatizes the urgency of conservation along with development of both conventional and alternative energy sources."

Unfortunately, however, Mr. Schlesinger quoted these sentences following some remarks you yourself made to the effect that the petroleum industry needs incentives for exploration if new oil is to be found. In so doing, Mr. Schlesinger implied that Mobil believes the United States is going to run out of oil and therefore new incentives for exploration will not provide substantial additions to U.S. oil and gas reserves.

Of course, I said nothing of the kind, as even a cursory perusal of the pamphlet will show. Instead, I stated that: "our natural resource base comprises large quantities of undiscovered petroleum (oil and gas) both onshore and offshore" and went on to argue that, if the nation is to have adequate energy supplies "we must accelerate the search for conventional oil and natural gas here and elsewhere in the Free World," as well as expanding use of coal and nuclear power and conducting a parallel effort to develop alternate energy sources (oil and gas from coal, shale and solar energy) " for a more distant time frame."

I went on to advocate that new crude oil and new natural gas be priced near the levels of imported oil, to encourage conservation and stimulate the discovery and development of additional domestic reserves that will cost the customer no more than the foreign source supplies they will replace.

It is clear from the foregoing that I did *not* say that adequate incentives for further oil and gas exploration in this country would be unproductive, as Mr. Schlesinger's use of the Mobil quote implies. I think, moreover, you will agree with me that such a cavalier use of a company's materials, wrenching statements out of context to prove the opposite of what was intended, cannot be passed over, especially when the remarks were made in the Senate Finance Committee during one of the most crucial sessions in its history.

I am enclosing a copy of the Mobil pamphlet and of the relevant section of the transcript of the Senate Finance Committee hearings, and I would appreciate it if you could make this letter part of the record of the hearings.

Sincerely,

HERMAN J. SCHMIDT.

Secretary SCHLESINGER. As I indicated to you, the number of drilling rigs in operation has tripled in just 4 years.

Senator GRAVEL. That is not enough. Maybe we need 10 times more than that.

Secretary SCHLESINGER. That is quite possible, but there is limited capacity in the production of drilling rigs. For new oil we are giving the world oil price. Even though—as was pointed out earlier—that happens to be a cartel price, in order to induce the kinds of exploratives activity that both of us want.

If that world oil price does not induce a response of that sort, and if we do not find the requisite amount of oil, I hope that we will all recognize what the consequences must be for American policy and for the American economy.

Senator GRAVEL. I think we will have to wait, Mr. Secretary, for another year to get your report card and then we will judge it after the report card is in. I submit if your administration policy is successful we will see a greater dependence at the end of this year and foreign interests, this year and next year.

Secretary SCHLESINGER. I can tell you what the report card will say in advance. The industry states that we are going to peak out in terms of world production and one should recognize what the reali-

ties are going to be and not indulge in the pretence that somehow or other there is a miracle that the Government can perform to create oil deposits that are not there.

Senator GRAVEL. And that is not what I am referring to.

The CHAIRMAN. This is a good exchange but, Senator, your time has expired.

Senator Matsunaga.

Senator MATSUNAGA. Thank you, Mr. Chairman.

I apologize for my tardiness, Mr. Secretary, and if the question I am about to put to you has been answered you can just disregard it. I have been informed that the administration is favorable toward exempting from the user tax those utilities which would be exempt from conversion to coal. Am I correct in my assumption?

Secretary SCHLESINGER. No; not if they are new facilities, sir.

Senator MATSUNAGA. In the case of Hawaii, under the coal conversion bill which has now passed the Senate, Hawaii would be exempt for both existing and new utilities.

Secretary SCHLESINGER. Sir, we are examining the question of a general exemption for Hawaii, but that would not apply to the case of new facilities generally throughout the United States. We do not have a judgment as yet to whether or not we support the exemption of Hawaii.

Senator MATSUNAGA. As one of many Americans who love the President, I would like to support the President in as many aspects of his program as possible. Of course, if he is not favorably disposed to a sensible proposal of exempting from the user tax those who are exempted from conversion, I may have to join the opposition. This is just a word to the wise.

Secretary SCHLESINGER. It is a most clear statement, Senator.

Senator MATSUNAGA. Mr. Secretary, as your intelligence has probably revealed to you, there is a concerted bipartisan effort now to kill even your wellhead tax and I was wondering now how important to your energy program is your wellhead tax?

Secretary SCHLESINGER. I think the wellhead tax is a vital part of the program. I do not think that when the consequences of killing the wellhead tax are fully weighed by many of those who advocate its killing at this time that they will continue to advocate it.

The wellhead tax permits us to get rid of the entitlements program. It will also be associated with a $14.40 price for a barrel of new oil. If the wellhead tax is killed we will go on with the entitlements program and we will go on with the upper tier price. I think that when the industry reflects upon that then they will see the advantages of moving to this much improved position over the status quo.

Senator MATSUNAGA. There is opposition to the tax based not so much on support of the industry but on support for the individual consumer. The wellhead tax will mean an 8 cents increase in a gallon of gas. It will hurt the consumer. It will add to inflation and further injure the consumer. How would you respond to that sort of an argument?

Secretary SCHLESINGER. That is a fundamental principle of the energy plan that we should have users pay the price for the energy that they are using. We are kidding ourselves if we import oil and then

mix that oil with domestically produced crude in such a manner as to subsidize every imported barrel of oil. The consequence of that is that we encourage further use of oil and further importation of oil. We should face up to the cost of the marginal barrel of oil which now is $14.40. Indeed, it will cost an extra 6 or 7 cents per gallon of gas. The reason that we have proposed to the Congress that the receipts of the wellhead tax be rebated generally to the American people is so that their real income position can be maintained at the same time that we make an appropriate price adjustment recognizing that almost 50 percent of our oil is now imported.

Senator MATSUNAGA. The biggest problem, as I see it and as members of this committee see it—and I am sure, Mr. Secretary, you agree—is a shortage in the not too distant future of our principal source of energy, oil, petroleum. In order to meet that crisis, that shortage of oil, we can do one of two things:

One, develop new domestic sources of oil and, two, develop alternate sources of energy.

Now, if we were to use that wellhead tax for developing other sources of energy as well as to explore for oil, don't you feel that this would achieve more of the intended purpose of your entire program than to rebate that tax to the consumer?

Secretary SCHLESINGER. It certainly is one of the intended purposes. The other intended purpose was to allow ourselves to adjust to the world price of oil while at the same time not affecting the general income of Americans. This would bring about income redistribution. The chairman raised that question earlier. I indicated I could not give a Presidential endorsement of any such policy, but that we are prepared to work with the committee to define a funding authority which with criteria could provide support for some of these alternative energy forms.

Senator MATSUNAGA. Even to the extent of giving up your proposed rebate?

Secretary SCHLESINGER. We are not so much giving it up in the circumstance you envisage as it is being taken away.

Senator MATSUNAGA. You are not giving up at this point?

Secretary SCHLESINGER. No, sir.

Senator MATSUNAGA. I have indicated to you, Mr. Secretary, from time to time—while I may be overly partial, in this respect—Hawaii offers to the United States a laboratory for the development of alternate sources of energy. For solar energy, we have sunshine every day. For geothermal energy, we have, geologists tell us, a hot steam well on every island and these geothermal sources exist on the west coast, too. Whatever knowledge is gained by experimentation and development in Hawaii will be useful to the rest of the country. For ocean-thermal energy, we have a wonderfully deep ocean right off our coastline. For wind energy, we have good northeasterly winds blowing constantly. Hawaii would be a good laboratory for experiments in all these alternate energy sources.

Now, I would like some indication from you, Mr. Secretary, how do you regard Hawaii in this respect?

Secretary SCHLESINGER. Senator, you painted a most enticing picture and I would like to make a personal inspection shortly.

Senator MATSUNAGA. I will be happy to accompany you on that trip, Mr. Secretary. But I would seriously like you to consider this.

Secretary SCHLESINGER. Yes. I think the points you make are well taken. We should examine, as a Department of Energy comes into existence, the geothermal possibilities which are unique in a sense to Hawaii. I would think it may be possible to produce over a period of years, as you introduce new capital equipment, all of your electric power in that manner, thus eliminating the need for fossil fuels. Transportation might be cheaper. We should examine those kinds of possibilities. You put the advantages in terms of solar energy very well.

Senator MATSUNAGA. Then, of course, there is also biomass energy, an inexhaustible source. We can continue to grow sugar cane and if the price of sugar goes down below what it is today instead of marketing sugar we might have to convert it to alcohol for mixing with gasoline. Of course, if saccharine is barred maybe the price of sugar will come up again, but these are possibilities I think that we definitely ought to look into.

Secretary SCHLESINGER. I wholeheartedly agree, Senator.

Senator MATSUNAGA. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Dole.

Senator DOLE. What happens if we pass this legislation in 1981? The equalization tax expires then.

Secretary SCHLESINGER. If you pass that House bill, yes, sir.

Senator DOLE. Decontrol, I understand, occurs in 1981 under other legislation.

Secretary SCHLESINGER. Both the EPCA and the House bill provide for the tax until I think December 31, 1981.

Senator DOLE. At that time there will be no tax and no controls and everybody will get the free market price; is that correct?

Secretary SCHLESINGER. If there is not intervening legislation in the interim which I would expect.

Senator DOLE. You would expect more controls and more taxes at the end of 1981?

Secretary SCHLESINGER. No.

Senator DOLE. Some have said that the best way to enact decontrol is to vote for the equalization tax because in 1981 the price controls will lapse. Is this the cleanest way to do it? We put up with this for 4 years and then you achieve what some consider to be the right objective.

Secretary SCHLESINGER. I think that there is merit in that argument, Senator. I don't think one contemplates higher taxes after 1981. In any case, I believe—and I think the chairman has recommended this—that the level of taxation be annually examined to see to it that the cash flow for the industry is reasonably good, to see that the incentives are adequate in accordance with the views of most people, and that there be such an annual report and review required by the legislation. Some years from now we may see far greater opportunities and as a consequence the need for cash flow enhanced and I would not anticipate higher taxes after 1981. The point is we should review the matter in the shorter run to see whether they might be appropriately reduced.

Senator DOLE. The argument then is that this is an easy way to decontrol. One problem is that in enacting new programs, it is going to be difficult to terminate those programs. So the easiest way is to continue to tax so that argument probably falls because knowing the history of the Congress and I think the pressures that might be applied at that time would negate any thought of decontrol and ending the equalization tax.

Secretary SCHLESINGER. Senator, I believe the industry has recommended this kind of tax with a decline rate over a period of years so the tax is eliminated, and this proposal is quite akin to that.

Senator DOLE. Does it cost less to save a barrel of oil or to produce a new one?

Secretary SCHLESINGER. It costs considerably less for most alternative conservation technologies. But one can think of complex——

Senator DOLE. You mean to save or——

Secretary SCHLESINGER. It is cheaper to save.

Senator DOLE. We had a chamber of commerce witness that estimated in 1980 the crude oil equalization tax would decrease demand for oil by 3 million barrels a year and in the same year generate $11.3 billion in revenue. This figures to be about $37.50 a barrel to save it and I don't think it would cost that much to produce it, if they are accurate in their figures.

Secretary SCHLESINGER. I don't think that is the cost of saving those barrels of oil which could be considerably higher than estimated by the various committees in the Congress. It would be about 650,000 barrels a day. But I don't think that is the cost because the funds from this will either be rebated or maybe used along the lines of Senator Long's proposal, to generate additional sources of supply. So I don't think this should be regarded as a cost.

Senator DOLE. You mentioned Senator Long's proposal, would that be similar to the proposal that former Vice President Rockefeller touched on a couple of days ago?

Secretary SCHLESINGER. I think that that is what Senator Long has in mind. As I indicated, we are willing to work with the committee in defining such a funding authority with appropriate criteria for use of those funds.

Senator DOLE. In the area of rebates we had witnesses yesterday from the New England area. They certainly have a problem and are concerned. So I can understand why there may be a rebate for residential heating oil but it seems to me that you are in effect subsidizing foreign oil imports when you give a subsidy. You don't quarrel with that?

Secretary SCHLESINGER. No, sir. The underlying premise in this is, as well as consumer, household use of natural gas and propane, is that the adjustment of the American households to these higher energy costs should be gradual. In that regard you are perfectly right that this is a continued form of subsidy.

Senator DOLE. They are still building new homes outfitted with oil furnaces. When you get to Virgina where only electric heat is offered in new homes in many cases the primary fuel to heat those houses is oil related, it is indirect. Would there be rebate in that area and should there be rebate—there in oil-based electricity? How do we have equal-

ity insofar as rebates are concerned when we talk about this one problem?

Secretary SCHLESINGER. Well, we have equality by treating all home heating fuels the same way. There is the rebate for fuel oil. There is the special protection for the household use of natural gas. There is the similar procedure for propane, and finally the utility rate reform package would bring about a reduction of utility rates to the homeowner or relative to industry. So there is a form of protection for the household consumers to shield them from the sudden impact of these rising energy prices.

Senator DOLE. I want to clarify—I don't have the report here—but you indicated that newly discovered oil would have a price equal to that of world price. Is that a correct statement? The House made some distinction in the ad hoc committee with reference to this section. Did they change the definition of new new oil?

Secretary SCHLESINGER. No, sir, oil pricing is not a part of the legislation. It is not a part of the House bill. Indeed, under the House rules it is a nongermane issue. They changed the definition of new gas from that which had been proposed by the administration. Oil is not a part of the legislation. The new definition for new oil would be accomplished under the authority granted in EPCA in 1975.

Senator DOLE. I have the report of the ad hoc committee, National Energy Act, page 56, paragraph 4, "Deletion of special rules for new oil for purposes of crude oil tax." We are talking about pricing and tax, maybe there is some——

Secretary SCHLESINGER. That is simply for the purpose of the tax. When we proceed to establish that new tier that would be equal to the world oil price. Consequently, no tax would be collected on that.

Senator DOLE. That was to avoid any windfall to the refinery, I assume.

Secretary SCHLESINGER. Yes, sir. The oil pricing issue, though, is not germane under the House rules.

Senator DOLE. That that is the price and according to your comment that should be enough, if it is 40 percent more than they receive now.

Secretary SCHLESINGER. Yes, sir. It is about 30 percent more.

Senator DOLE. We also have testimony that what purpose does it serve to have the user tax when you can't convert to coal? Are you going to exempt those who can't convert to coal?

Secretary SCHLESINGER. There are the various tiers. There are different types of exemptions. We had not recommended initially that there be exemptions. They are in the House bill. There are advantages of two types.

First, the higher price will induce some conservation.

Second, for many firms there is variability in the use of facilities.

In our judgment, providing the gas tax, which would be kicked in after 1,500 hours a year operation, would provide a powerful incentive to peak load the oil and gas burning facilities and to use coal and nuclear in the case of utilities at base-loaded plants. So you achieve savings as a result of this tax even though the facilities continue to exist.

Senator DOLE. Now, just one more question on the small refiner's bias that has been raised by two or three members this morning and

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you indicated, at the suggestion of Senator Long, maybe it is no longer a problem, but wouldn't it be a problem in 1981?

Secretary SCHLESINGER. Yes, sir.

Senator DOLE. This is sort of staying the execution.

Secretary SCHLESINGER. No, sir. What I indicated was that as a result of the discussions in the House we are preparing a study of alternatives that will be shared with the Congress as to how to deal with this problem before 1981 comes upon us and the type of determination for those refineries that you envisage.

Senator DOLE. Mr. Chairman, it was brought to my attention yesterday by one of what I thought was a major oil company, but they indicate there are different degrees of major oil companies—this was one that was a small major oil company—they indicate in proposing equalization tax the administration really gives the largest companies, the so-called Big Five, an advantage over others because when they refine as an integrated company they are buying their own oil and a lot of it is produced in foreign countries where the smaller 10 of the 15 major companies don't have that advantage. Most of it is produced domestically so we have the five largest major oil companies. That tax will affect them less than it will affect in the next 10 largest majors. Would you address that question?

Secretary SCHLESINGER. We would be happy to look at that question with you, Senator. There is no evidence we have that that would be true. There have been questions raised as to whether this might not be biased against the independent refiner.

Senator DOLE. But the tax only applies to domestic production and since many of the Big Five that import——

Secretary SCHLESINGER. The taxes are variable depending on the world price.

Senator DOLE. Right.

Secretary SCHLESINGER. Importing oil means that they have to pay that same price at the refinery gate. Indeed, some of the majors are the ones who in a sense are most disadvantaged by the tier procedure because they are disproportionately larger in old crude. So I would think that a careful study would not indicate that this procedure would be biased in their favor. What might be the case is that with the shortage of crude that the independent refiner might be subject to some potential damage and we are prepared to look at that, too, with you.

Senator DOLE. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Byrd.

Senator BYRD. Mr. Secretary, will this program achieve energy independence for the United States?

Secretary SCHLESINGER. No, sir. We would expect to be importing 5.8 billion barrels a day in 1985.

Senator BYRD. Then I take it that energy independence is no longer a governmental goal?

Secretary SCHLESINGER. No, sir. It is not an attainable goal, particularly in the near term. What we would like to do is to reduce imports to the point that we are essentially invulnerable to a cutoff, but at the same time taking advantage of that oil that is more readily available overseas than in the United States.

Senator BYRD. You indicated earlier that you feel an important part of the program is to increase prices.

Secretary SCHLESINGER. Yes, sir. At the moment we are subsidizing imports. That makes no sense. It does not bring home the full cost to the consumer. Senator Dole made some observations with regard to the anomaly of the rebate on home fuel use. That is, indeed, an anomaly, but we think, generally speaking, we should bring home the full cost to the user. We know that industry, at least, is very sensitive in terms of its conservation techniques to the price of oil.

Senator BYRD. I represent a consumer State and in the past I have not been inclined to support an immediate decontrol of oil. But I am coming around somewhat to the point of view now that consumers would be better off, in the long run, if we were to decontrol. This is because, in either case, the consumer is going to be hardhit. They will be hardhit under your program and also they will be hardhit if prices are decontrolled.

Secretary SCHLESINGER. Not if you approve the rebating measures, Senator.

Senator BYRD. I am going to get to rebating in a minute. It occurs to me if you were going to decontrol—as I say, I voted against it in the past—but from the consumer's point of view, if you were to decontrol and if we go to an excess profit tax, that might be better in the long run for the consumer.

Now, coming to the rebates, I felt in looking over this program during the last month to 6 weeks, since it has been presented, that the program is a sort of Rube Goldberg puzzle. I do believe that your testimony has clarified it to some extent. I have been trying to visualize in my own mind just how I should explain this when I go into the factories of Virginia, as I do frequently, and speak to 200 or 300 people here and 500 or 600 people there; and go up and down the main streets and speak individually with the citizens, go into a neighborhood bar and drink some beer with some constituents such as I did in Prince William County last evening, and this matter comes up.

Now, here is the way it impresses me. No. 1, this legislation would be the largest peacetime tax increase in the history of our Nation. But you say I can tell my factory workers and my friends in the neighborhood bar "Don't worry about that. That is nothing to worry about. I have got it straight from my friend, Secretary Schlesinger, that what we are going to do is to take good care of you. We are going to give you back 96 cents of every dollar that we take away from you."

Now Secretary Schlesinger is a very persuasive individual and may be able to sell that, but if I try to sell that, I am going to need more Secret Service protection than Vice President Mondale.

Secretary SCHLESINGER. We will run 99 44/100 percent, sir.

Senator HANSEN. That will make it float.

Secretary SCHLESINGER. If you have difficulties explaining the wellhead tax, Senator Byrd, the explanation of the excess profits tax and how it works is going to be a lot harder.

Senator BYRD. Anyway you look at this it seems to me that what you are doing is putting a very large tax increase on the people of our Nation, and then you say, "Well, that is going to be offset. We are going to give you back 96 cents of every dollar we take away from you." You are taxing my credibility if I try to tell people that.

The Wall Street Journal ends its editorial with this statement:

> The Carter tax increase would do nothing whatever to solve any of our real energy problems, but it would run terrible risks with the economy on which we all depend. If Congress does pass this bill, it will be the most ill-conceived piece of economic legislation since the Smoot-Hawley tariff of 1930.

This statement may be too strong. I don't know.

Secretary SCHLESINGER. I thought the Smoot-Hawley tariff was coming back into style.

Senator BYRD. Not with the Senator from Virginia.

Secretary SCHLESINGER. The wellhead tax, as was indicated by Senator Dole, happens to be the preferred way by some members of the industry to bring about the adjustment to world prices. The procedure we have here will, contrary to the observations of the Wall Street Journal editorialists, permit us to go to the world price of oil for new oil, a 30-percent increase. If we understand the price mechanism, I presume that that is what lies behind the argument of the Wall Street Journal editorial.

That should bring about even greater effort at exploration and development. That is the way we get there. The consequences of not doing so are to have a continuation of the entitlements program and a continuation of an illusion that somehow or other if we mix foreign oil with domestic oil and subsidize imports in that way, that nothing is going on. That seems to me to be confusing.

Senator BYRD. How much should we rely on nuclear power for our energy source over the next 5 to 10 years?

Secretary SCHLESINGER. In my judgment we should eliminate what has been the stagnation of the nuclear power industry that results from a number of factors including the licensing. We should eliminate the delays and the roadblocks to building a nuclear powerplant, and then allow the utilities to decide whether they want coal-fired or nuclear-powered plants.

I would guess the utilities in bulk would be about 50–50 between coal and nuclear.

Senator BYRD. You favor the expansion of nuclear power, I assume?

Secretary SCHLESINGER. Yes, sir. We have no alternative but to make better use of nuclear power.

Senator BYRD. Do you favor the breeder reactor?

Secretary SCHLESINGER. I would favor the continued effort on the development of the breeder technology. I do not favor the construction of the Clinch River plants. I think that that is a waste of the taxpayers' money.

Senator BYRD. But I take it you favor the principle of the breeder reactor?

Secretary SCHLESINGER. I am in favor of having a nuclear efficient option beyond that period in which we will run out of uranium, should that option be taken up as the best alternative at that future date.

Senator BYRD. But I take it from that that you do favor the principle of the breeder reactor?

Secretary SCHLESINGER. I favor having that technology at hand along with other technologies to see what is most appropriate to solve the Nation's energy problems in the year 2001.

Senator BYRD. Thank you. I ask unanimous consent to insert the Wall Street Journal editorial in the record.

[The editorial referred to follows:]

[From the Wall Street Journal, Sept. 7, 1977]

REVIEW AND OUTLOOK—THE CARTER TAX INCREASE

As the Senate returns from its recess, it finds on its desk the *largest peacetime tax increase* in the nation's history. Mr. Carter calls his tax boost an "energy program," but in fact it is a cleverly disguised grab for the nation's paychecks.

A great deal of pettifoggery has been devoted to camouflaging the enormity of the tax implications in the energy package. The Treasury, the House Ways and Means Committee and the staff of the Joint Committee on Taxation have made estimates of its revenue effects based on a common set of figures. The estimates vary depending on how the figures are stacked up, but the most common result is a finding that the House-passed bill would produce "net" revenues of $52.9 billion between now and 1985. This is a tax increase averaging $6.6 billion a year, not inconsiderable in itself. But the estimate is so loaded with gimmicks it borders on fraud.

First, by "net" revenues the estimate means what's left over after various rebates. In other words, the $6.6 billion a year is what's left over in receipts after the bill's expenditures. Second, the period chosen is the time over which the taxes are phased in, thus underestimating their ultimate impact. Third, because the House bill extends the crude oil tax only until 1981, the $52.9 billion estimate assumes this tax will expire halfway through the period studied, though it is both a huge money raiser and the guts of the Carter energy program. And of course, this estimate entirely excludes the administration's 50-cents-a-gallon standby gasoline tax, which was not included in the House package.

At current consumption levels, for example, a penny-a-gallon tax on gasoline would yield a billion dollars, so 50 cents is worth $50 billion. Based on current production of "old" and "new" oil, the crude oil tax would yield something like $15 billion.

The gas guzzler tax is more complicated. This year the auto industry will sell about 10 million cars with fuel economy averaging 16 to 17 miles a gallon. By 1985 such a car would be taxed about $2,000, so the tax is worth $20 billion. If you can cajole someone in the auto business to do a more exact calculation applying the 1985 rates to present auto models, you get a figure of about $12 billion. Even without the new tax, of course, auto sales over the next few years will tilt toward high-mileage models. But will the adjustment be enormous enough to justify estimating the gas guzzler tax receipts at only $100 million?

If you look at the tax on industrial use of oil and gas, finally, you realize that a good prediction of its revenue effect is impossible. No one has more than the fuzziest notion what this part of the bill means. Burning the light bulbs of the accountants and lawyers as they work through the monster will take enough oil to keep the sheiks in business for at least a decade.

CARTER TAX INCREASE

[In billions of 1977 dollars]

Tax	Joint Committee staff, 1981	Chamber of Commerce, 1985	Final rates applied to 1977
Gas guzzler	0.1	2	12
Crude oil	14.6	12	15
Industrial use	2.8	—8	God knows
Miscellaneous	1.0	.....	1
Subtotal	18.5	22	28+
Gasoline tax	.....	35	50
Subtotal	18.5	57	78
Inflation impact	.....	16	Sight
Grand total	18.5	73	78+

A somewhat more realistic picture can be developed by sorting out the gross figures in the Joint Committee tables, isolating its 1981 estimates to avoid the distortion of assuming the expiration of the crude oil tax. This reveals a tax boost of $18.5 billion a year. But by 1981 the bill's taxes would not yet be fully applied. In 1983, for example, there would be a new tax of $1.50 a barrel on all

oil used to generate electricity, surely not a small item. Even on the official numbers, the Carter tax increase ultimately exceeds $20 billion a year.

Watching the pea-and-nutshell shuffling being done with these official figures, though, one wonders what other games were played in generating them in the first place. The estimates of revenue effect depend heavily on assumptions about how fast the economy will respond to conservation incentives. Will people pay the gas guzzler tax, or simply stop buying cars? Will industry actually be able to convert to coal, or will it get stuck with the tax?

An independent estimate by the U.S. Chamber of Commerce came up with considerably higher revenues from both the gas guzzler and industrial use taxes. The Chamber also calculated the higher taxes the program would cause by generating inflation and pushing taxpayers into higher personal income tax brackets. The Chamber points out that as originally proposed the energy package would increase the federal government share of GNP to 25% from 21%.

To grasp the general magnitude of the program, it's also useful to go through a few back-of-the-envelope calculations of what the ultimate tax rates would do if applied to the 1977 rates by paying the new taxes or by avoiding them, for example, by closing down Detroit for a year or two.

Now, conventional Keynesian economics holds that taxes won't hurt output so long as government expenditures at least keep pace. If this were true, the world's top economic performer over the last decade would have been Great Britain. The general Western economic problems today are that governments route too much of income away from productive private uses, that high tax rates destroy the rewards for production and capricious economic policies and tenacious inflation destroy the climate for investment to produce jobs and income. No matter how the receipts were spent or rebated, the energy taxes would be a massive new dose of precisely these kinds of poison.

And for what? There is no danger that the earth will run out of energy in any time span the mind can comprehend. Even the government is not truly serious about an "energy crisis"; if it were its programs would include production incentives. Dependence on imported oil is a legitimate national security problem, but the answer lies in the ongoing oil storage program and not in a huge tax increase. The real energy problem, and the real chance for a crisis, is the government refusing to let market pricing mechanisms work.

The Carter tax increase would do nothing whatever to solve any of our real energy problems, but it would run terrible risks with the economy on which we all depend. If Congress does pass this bill, it will be the most ill-conceived piece of economic legislation since the Smoot-Hawley Tariff of 1930.

The CHAIRMAN. Mr. Hansen.

Senator HANSEN. Mr. Chairman, there has been a study done by the International Trade Commission, an organization that is under the jurisdiction of this committee. I assume the Secretary has seen their latest report which disagrees with the CIA study.

I don't have any questions. I know there have been many studies made and completed. Have you seen this report?

Secretary SCHLESINGER. I have not seen the report. I have read about it. I think the principal difference is with respect to Soviet importation, and I think that good questions can be raised in that area. I think that the CIA is quite right, the Soviets are going to have serious production problems relative to their aspirations, but they will probably not have the foreign exchange to import 3½ million barrels a year.

Senator HANSEN. I think you made the point, Mr. Secretary, that it seems to me would be important. I think that it would be fair to say that a number of Americans have assumed that the CIA report was an expression of their estimates of the finite reserves—of resources in this country, rather than an examination of the ability of the various nations making the best possible use of those resources to develop reserves. You have made the point that I wanted to bring out. I think the CIA report did not address so much as I understand it, what the total

potential for petroleum, both oil and gas development was in this country as it adressed the question of the ability of the various nations to produce oil and gas in relation to their growing need.

Do you agree generally with that?

Secretary SCHLESINGER. Yes, sir.

Senator HANSEN. I have no further questions. Your brilliance is matched by your persistence and your stamina.

Secretary SCHLESINGER. Thank you, Senator.

The CHAIRMAN. Mr. Secretary, I am going to give you a copy of a statement here and ask you to take a look at it. This is a statement that Senator Robert Byrd gave me a while back. I don't know if it was authorized to be put in the record but I would point out, Mr. Secretary, that Senator Byrd, in my judgment, is one of the President's best friends. He sees the President more than I do. He has a chance to communicate with him more than I do and he also communicates two ways, one from the President to the Congress, the other from the Congress to the President. Senator Byrd, I think, has pointed out what the Senate is likely to be willing to do.

[The statement of Senator Robert C. Byrd follows:]

STATEMENT BY SENATOR ROBERT C. BYRD

I wish to congratulate the Chairman and members of the Finance Committee for the yeoman work you have been doing on the tax provisions of the comprehensive National Energy Policy proposed by the Administration. I know that the Committee initiated hearings on the energy tax provisions during the August statutory recess, and that you have labored long and hard in seeking ways to strengthen the President's proposal.

The purpose of my statement is to follow up on my letter of August 19, 1977, to the Chairman of the Committee. I suggested therein that if the Committee should recommend the enactment of a crude oil equalization tax or a gas guzzler tax, the Committee might consider utilizing any revenues obtained from such taxes for three purposes: First, to increase the domestic supply of energy through the development of an alternative fuels program; second, to conserve energy through the development of fuel efficient mass transit; and third, to assure adequate facilities to transport the nation's coal through the construction and modernization of rail systems.

I feel that the Administration's proposal to rebate across the board the monies generated by the proposed taxes fails to adequately reflect the nature of the energy crisis facing the nation. These monies should not be dispersed through rebates except possibly in the case of low income individuals who are most severely impacted by steadily rising fuel prices.

The energy crisis portends a worldwide shortage of crude oil and natural gas—fuels upon which modern mass industrial societies, such as the United States, have grown dependent. I recognize that there is disagreement on the actual time when demand for crude oil and natural gas will outrun available supply. There is, however, a consensus that the likelihood of a shortage in the not too distant future is real. Action is required now if we hope to have viable alternative energy sources in place by the 1980's when they may be needed to supplement our dwindling supplies of oil and natural gas.

In light of our serious energy situation, we must seize the opportunity and use the revenues from the taxes at issue for specific energy-related purposes. First, we must proceed with the development of alternative energy resources. Such development would provide for an increased supply of energy, protect our country from any interruption in our oil supply in the event of another embargo, and conserve crude oil and natural gas.

Rather than the disparate approach which we have taken toward alternative fuels in the past, we should view this as an opportunity to establish the basis for a well-funded, integrated, alternative fuels program. The options here are numerous. They include an accelerated program of research, development, and demonstration of gasification and liquefaction processes for the production of

synthetic fuels from coal, as well as for processes to assure that coal can be burned in an environmentally acceptable manner. The production of synthetic alternatives from coal would help to assure the availability of liquids and gases that will be in demand for the foreseeable future.

Other major options are the application of the revenues to the development of geothermal energy, oil shale, wind energy, and biomass energy. There is considerable potential for these energy sources which, if tapped more vigorously, will significantly add, in the coming decades, to the level of energy production in various sections of the country.

Solar energy is another clearly under-utilized alternative energy source. Water heated by solar energy is now economically competitive in many areas of the country. Similarly, space heating and cooling are now economically feasible in some regions. Yet, we have failed to develop a wide range of incentives for business to apply solar technology to today's energy needs. We should be able to do more to encourage commercial and agricultural enterprises, to adopt solar technology. In addition, we need to do more to encourage the development of solar-generated electricity.

In short, any monies generated by the proposed gas guzzler tax and the crude oil equalization tax might best be used to subsidize the development of these various alternative energy sources. And, let me point out that the American people appear to be strong supporters of an alternative fuels program such as the one I suggest. A *New York Times*—Columbia Broadcasting System poll this summer on the national energy situation found that close to three-quarters of the respondents would support an increase in taxes to spur the development of alternative energy sources. When asked by interviewers, "Would you favor or oppose a major government program to develop new sources of energy, even if it means higher taxes to pay for it?" some 71 percent answered in the affirmative. This appears to be a clear indication of public sentiment on this issue.

Second, the Committee should consider applying any tax revenues produced by the proposed gas guzzler and crude oil equalization taxes to further advance conservation in the transportation sector of the economy. This sector accounts for over half of the total domestic demand for petroleum.

There is a need to spur the development of mass transit options, to make mass transit more generally available to the public. It is well known that the energy efficiency of buses and subway cars is dramatically higher than that of automobiles. According to a recent Office of Technology Assessment study, for example, a transit bus carrying 30 passengers is six times as efficient as an automobile carrying an average of 1.4 people.

We are moving ahead with the development of more efficient automotive vehicles, and this is absolutely necessary. However, we have yet to realize the full potential of mass transit for urban and rural areas. The Committee should consider earmarking some of the monies generated by the proposed taxes to provide capital assistance for purchases of buses, for construction of rail systems, and for modernization of existing systems. I do not believe that this nation should have a go-slow policy in the area of mass transit.

We must also assure that our existing railroad system will be able to handle the increased coal production envisaged in the national energy program, and to meet the military security needs of the nation.

These are some of the measures that can be taken now and in the immediate years ahead. If the Finance Committee does approve the gas guzzler and crude oil equalization taxes, I would urge the Committee to give careful consideration to using the monies generated by these taxes for such purposes as would help safeguard our national energy future. This would require investing the revenues in the development of more fuel-efficient transportation systems and in the subsidization of alternative energy resources.

The energy program proposed by the Administration can be strengthened if the Committee recommends using the considerable revenues raised in such ways as I have suggested. Gross crude oil equalization tax collections are estimated by the Joint Committee on Taxation at $48.9 billion between 1978 and 1982. These monies would be available to improve and expand our passenger and freight rail systems and our bus systems and to foster alternative energy sources.

Investing the monies in the ways I have suggested will not do all that needs to be done. They are steps, however, that face up to the energy challenge confronting us. They are steps in what I believe to be the right direction.

I thank the Chairman and the members of the Finance Committee.

The CHAIRMAN. I don't like to just tell you we can't do what you would like for us to do, but I don't think I am a good friend of this administration or of yours if I go and lead you down the primrose path and tell you everything is going to be great and then have you read in the paper the committee voted this bill down.

Senator Byrd pointed out in his letter basically that he believes the American people are willing to pay these taxes, particularly the gas-guzzler tax and the wellhead tax and that they will go along with it provided that they are satisfied we are spending this money in ways that will help to meet the energy problem.

He refers to polls taken by the New York Times which the Columbia Broadcasting System presented on their recent program. When the question was asked "Do you favor or oppose a major Government program to develop new sources of energy even if it means higher taxes to pay for it?", some 71 percent answered in the affirmative.

Senator Byrd is suggesting to this committee that we move in that fashion. I might say to you, Mr. Secretary, that it won't be as easy to do that as some people might anticipate. The Energy Committee was discussing it. I don't know whether they voted on it or not, but they may have already voted on our energy tax.

Senator HANSEN. If you would yield momentarily, Mr. Chairman, let me say that what we did was to report out the natural gas deregulation, without any recommendation.

The CHAIRMAN. My colleague, Senator Hansen, is on the committee. He told me yesterday he was of the impression the administration wanted to keep the Energy Committee from voting against the wellhead tax. You better see that they didn't vote at all, because if they voted they would have voted against it. I think that is a fair indication of the feeling in the committee.

I think our chances are good of getting the revenue to pay for the kind of program that Senator Byrd is advocating, and if we think something is worth doing we are willing to vote for the taxes to pay for it. I believe we would be willing to support this approach, and I am pleased to see that you have been around here long enough to recognize that when people share a common goal, if they have suggestions to make as to how they think it could be better implemented, that you are willing to consider their views and adjust your views to theirs in order to get something done. I think that that is about the kind of approach that we ought to try to take.

There are one or two things you covered that I think we ought to understand more about. One of them is that it seems to me that if you are going to move to the public paying for the cost of replacing the energy that they use, you ought to be willing if not now, at least sometime in the reasonable near future to let the person who is producing the energy charge what it will cost him to replace it.

In other words, if a fellow is selling you a barrel of oil, sooner or later you are going to have to agree to let that fellow sell that barrel of oil for what it costs to produce another barrel of oil and for the old oil that is still not in the picture.

What do you estimate the cost of replacing a barrel of oil or at least its energy equivalent in the country today would be?

Secretary SCHLESINGER. People in the industry have informed me that the cost of discovery is approximately $3 to $4. The estimates vary if you throw in natural gas as part of that barrel of oil. They don't distinguish searching for oil and natural gas between the two but the cost of discovery is $3 to $4. I am not in a position to say what the development-production costs are.

The CHAIRMAN. If we go into the alternate sources of energy as I think we should—and I think you and I agree we should go into those alternate sources—I would like to point out to you that we will benefit from a great deal of technology that we cannot get by just experimenting.

I'll just take one example, but we could take a lot of others. The Exxon refinery right in my home town of Baton Rouge, La., used to have 9,000 men employed. They are getting a lot more production now than they did when I was a young man and first went to Baton Rouge, and they now employ about 1,500 men. In terms of what it takes in manpower to produce something, they are able to do just a great deal more. We are not getting that technology in producing shale or brine or other things because we are not engaged in it. If we are engaged in it, the people who are working with it will undoubtedly make all kinds of breakthroughs, which I think we should be pushing for.

I would like to make one other point, Mr. Secretary. You referred to the cost of producing Near East oil as $1 and that may be correct, but shouldn't we all recognize that just because it might take $1 to remove it does not mean it is going to be worth $1. In other words, if I went on the White House grounds and cut down all the President's trees and hauled them away and said, "Look, it only cost me $1 to cut this tree down," I don't think the President would be willing to part with that tree for $1. I think he would think it was worth more than that.

There is intrinsic value in energy and I think if not now at least at some point in the future we should move to recognize that. For example, it is extremely unfair to a farmer who is not producing energy to be getting a royalty based on $5 oil if he is just sitting there on a piece of land and someone came and asked him to sign a lease and found oil on his property and someone down the road is getting a royalty based on $14 oil.

Gas could be an even more farsighted problem. It is hard for him to think he should be forever penalized because the fellow with whom he did business committed the original sin, that is, he drilled before the Arabs clamped down on us. Sooner or later I think those things will have to come to light. I wonder if you agree with that?

Secretary SCHLESINGER. I am not sure how many producing companies would be generous enough to adjust the lease arrangements under those circumstances.

The CHAIRMAN. Mr. Secretary, honestly I think there is an inequity there that should be recognized.

Secretary SCHLESINGER. There is a problem of equity. I entirely agree, Mr. Chairman.

The CHAIRMAN. Furthermore, with regard to the discussion that seemed to become a little animated between you and Mr. Gravel about

the profits of companies, we ought to be able to get a fair estimate of what the companies are making and not making. My impression about people in the oil business is that they are just like everybody else in terms of the story they are going to tell you. It reminds me of that story about the fellow who was teaching his son about the business. He said, "Son, how much is two and two?" And the son said, "Pop, it all depends."

"On what?"

"Are we buying or selling?"

When those oil companies go to try to borrow money from the bank or from an insurance company in order to go on drilling, I am sure you know that they don't tell those people at all the sad story they tell you when they come and tell you the price is not adequate. If you get it from the other sources, the people from whom they are borrowing or even the people to whom they want to sell some of their stock or some of their assets including the wells, you really get the story told the other way around, and the information should be there. It might be what is considered an excess profit tax program.

I am not in favor of writing a statute that has the defect of the World War II statutes. I might say that these fellows were having a drink at the Mayflower Hotel and after they had a few rounds one fellow said, "I have to go home; give me the tab." He said, "I will pay. I am on an expense account." And one man said, "I will pay it, I am in an excess profits tax bracket." He said, "It won't cost me but 2 cents on $1."

The third one said, "Fellows, let me have the check." He said, "I have a cost-plus contract. I am making a 10 percent profit." I don't think we should draw it so that anybody could tax the cost of the drinks at the Mayflower Hotel. It seems to me if you are going to have excess profits tax you should let people credit against it only production costs or certain tax costs that you think essential, not the selling cost or the advertising cost, but the ones that have to do with getting more energy. Perhaps that might make people feel better.

It would put that into place, but we only have two ways to go as I see it. We either have to make money available to the banking system or we have to make it available out of producers' income. Is that about the way you see it, Mr. Secretary?

Secretary SCHLESINGER. Yes, sir. On the question of profits, I do not regard oil company profits as excessive. They have grown. They serve a useful function. I do not, however, respond warmly when the companies attempt to cast themselves as members of the deserving poor. They are not.

The CHAIRMAN. I don't think they are, Mr. Secretary. I have asked this committee staff to seek to obtain the information year by year on the profits made in the oil industry by the larger companies—the top 30 or so—and compare that to the profits made in other industries. We have a little pamphlet which we could give you on that. We have been compiling it year by year just to have prior information, and I suggest you look at that and compare that to the information that you people have available. My thought is that if you really want to get production in this area you ought to make it more profitable

for people to put their money into energy than it would be to put their money into something else in a free country with the free flow of capital from one development to another you could expect people to put their money into whatever appears to be the most profitable.

I am not sure whether I was taught that in my courses in economics in college or not, but I know that when I came here over a period of time I learned that to be true. People are going to invest their money where they think the best return can be made.

Secretary SCHLESINGER. I think it is a very sound principle, Mr. Chairman, but I would point out that the rate of return, as best as we can estimate it, in exploration and development is something on the order of 30 or 40 percent, which by comparison to most industrial sectors is quite high. The industry is freighted down indeed by an excessive number of service stations and refineries, on which the rate of return is very low and sometimes negative, but in exploration and developments the rate of return is happily high and we share the objective of keeping it high so the capital continues to flow into that area.

The CHAIRMAN. Since you started your program my impression was that, as you stated to me on one occasion, the large companies generally would go along with what you were trying to do. That is your bill. Compared to no bill they would recommend your bill. I have been dismayed somewhat to hear the independents come in here and ask us not to vote for any tax at all or not to vote for wellhead tax. I am pleased to say that one of the top executives officers of Exxon came to me the other day and said their position remained the same as it was. I asked if they would object if we put an excess profits tax along the line Senator Gravel suggested several years ago and their answer was if it would help the problem they would be willing to go along with it. If they thought it would help assure the public they were not seeking a ripoff.

I made the point you just made. I said, "If we are going to enact an excess profits tax, that is no favor to you but that might make the public feel more secure. If we enact an excess profits tax and let you have certain deductions from it, I don't think you ought to be permitted to deduct the cost of building any more filling stations." They were the first to agree that that was fair. The deductions ought to be allowed in areas that bring about more production.

I hope, Mr. Secretary, in this period of good will and recognizing the national problem we could continue to work together as you have indicated your desire to do and produce a bill here that while not identical with what you recommended or the House bill, will seek to achieve at least the same purpose that you had in mind when you came to us at first.

Thank you very much.

Secretary SCHLESINGER. Thank you.

[Whereupon, at 1:05 p.m. the committee recessed. to reconvene at the call of the Chair.]

APPENDIX C

Communications Received by the Committee Expressing an Interest in These Hearings

STATEMENT BY SENATOR EDWARD M. KENNEDY OPPOSING $8 BILLION OF TAX EXPENDITURES IN THE ENERGY TAX BILL

The House-passed version of H.R. 8444, the National Energy Act, represents an important step in the efforts of President Carter and Congress to develop a rational and effective national energy policy. There is much in the bill to commend it and I support many of its provisions.

However, the House bill includes a number of provisions that are undesirable and should be rejected by the Senate. These provisions involve a series of new or expanded tax subsidies for individuals and businesses, including the following:

A. INDIVIDUAL TAX SUBSIDIES

1. Residential insulation tax credit.
2. Residential solar energy equipment tax credit.
3. Residential wind energy equipment tax credit.
4. Tax credit for electric automobiles.

B. BUSINESS TAX SUBSIDIES

1. Business energy tax credits.
2. Tax credit for waste recycling equipment.
3. Intangible drilling and development cost deduction and percentage depletion deduction for geothermal resources.

These tax expenditures will cost the Treasury a total of $8 billion by the end of 1984, or over $1 billion a year over the life of the bill. The enactment of such large tax subsidies is directly contrary to the tax simplification efforts that will constitute a major element of the tax reform legislation to be submitted shortly to Congress by the President. The proposed tax expenditures are also deficient as spending programs from the standpoint of need, efficiency, and fairness. Therefore, these tax expenditure provisions of the energy bill should be deleted by the Senate.

From the standpoint of tax reform and tax simplification, the new individual tax credits created by the House bill will have to be included on all individual tax return forms, including the short form 1040-A. This means new lines on the tax return form for every taxpayer in the country. Taxpayers will have to fill out supporting schedules for each of the new credits, and the IRS will have to issue detailed regulations to implement the credits. This new complexity is clearly contrary to the goals that Congress and the Administration are trying to achieve in the tax simplification effort.

For business taxpayers, the number of new tax credits and deductions—both personal and business—will be even larger. Still more complex forms and regulations will be the inevitable result.

It is unfortunate that the Administration and Congress are taking up consideration of the energy tax bill seperately from tax reform. If the energy tax expenditures were being taken up in conjunction with the tax reform bill, it is likely that they would have all been rejected, on the ground that they would make the tax system more complex. The Senate, however, can resolve this procedural issue by eliminating all of the tax expenditures from the energy bill and deferring consideration of them until we take up the tax reform bill next year. I commend this step to the Committee on Finance, and I hope that it will be followed by the Senate.

In addition, analysis of the tax subsidy provisions indicates that they are seriously deficient as Federal spending programs. Since they are tax expenditures, it is appropriate to ask the same questions that we would ask of direct spending programs:

1. Is there a need for the new or expanded Federal subsidies?
2. Is the tax subsidy structured efficiently to avoid making windfall payments to individuals or businesses for doing what they would have done anyway?
3. Is the value of the benefits equal to the costs of the tax expenditure?
4. Are the benefits available to individuals or businesses who, for other reasons, do not have tax liability?
5. Are the benefits of the tax subsidies distributed fairly among individuals by income and among businesses by size?
6. What are the effects of the tax subsidies on inflation?
7. What are the effects of the tax subsidy on competition within an industry?
8. How are the benefits of the tax subsidy allocated among regions of the country?
9. How does the tax subsidy affect the allocation of capital resources—that is, if capital is to be attracted to energy-related investments, what other areas of investment may suffer a capital loss?

These are crucial questions which I hope the Administration and the Senate Finance Committee will address and answer for the Senate before we begin floor debate on the energy bill. Failure to answer these questions means that the Senate will be voting in the dark on the expenditure of federal funds that ultimately will total in the billions of dollars. The Senate simply cannot perform its responsibilities to the taxpayers in such a fashion.

The accompanying pages analyze these tax expenditures and address some of the questions that should be raised. My hope is that this analysis will encourage more extensive debate on these and similar tax expenditures in the energy bill. The tax expenditures in the energy bill raise important issues of tax simplification and efficiency and fairness in the expenditure of federal funds. In my view, these tax expenditures should be deleted from the energy bill, because they are sources of increased tax complexity, and because they constitute wasteful and inequitable uses of limited federal funds. It would be a travesty of responsible action on the energy crisis to allow the crisis to become the pretext for adding a large number of new tax loopholes to the already loophole-ridden Internal Revenue Code.

THE TAX CREDIT FOR RESIDENTIAL INSULATION*

At first glance, it may be asked why anyone should oppose a Federal tax credit for home insulation. But when carefully examined, this seemingly generous gesture toward homeowners actually raises many serious questions, and turns out to be a costly and wasteful method of achieving the desired goal of residential insulation.

The insulation tax credit in the House-passed National Energy Act, H.R. 8444, has five fatal defects that should lead Congress to reject it:

It is inefficient, because the credit will not encourage many people to insulate their homes who would not insulate them anyway.

It is inflationary, because the supply of insulation is limited, and increased demand will only push up the price.

It is inequitable, because well-to-do homeowners will receive far greater benefits than low-income homeowners.

It is complex, because the tax return and the IRS audit process will become even more confusing and more complicated than before.

It is expensive, because the Treasury will lose $500 million a year as a result of the proposed tax credit, with no corresponding public benefit.

H.R. 8444 provides an individual income tax credit for "qualified" residential energy conservation expenditures. The credit is equal to 20 percent of the first $2,000 of such expenditures, with a maximum credit of $400. The credit applies to expenditures made between April 20, 1977 and the end of 1984. Items qualifying

*The discussions of the residential insulation tax credit and the solar energy tax credit are revised and updated from the analyses in Federal Tax Reform for 1976, a compendium of papers prepared by Stanley S. Surrey, Paul McDaniel, and Joseph A. Pechman at the request of myself and other Senators for use in the Senate debate on the Tax Reform Act of 1976.

for the credit include: insulation, storm doors and windows, clock thermostats, caulking or weatherstripping, and various devices for making furnaces and water heaters more efficient. The credit is available only for insulation of an individual's principal residence, not for vacation homes or other residences.

The idea of an insulation tax credit was born out of the energy crisis and the concern for energy conservation. Conservation is important, but so are other goals, such as the efficient use of Treasury funds, the need to keep the federal deficit under control, and the avoidance of complexity in the tax laws. Tax equity and fiscal responsibility require that Congress ask whether the home insulation tax credit is an appropriate and effective means of encouraging energy conservation.

There are five major objections to the credit as it was approved by the House of Representatives in H.R. 8444:

1. *The insulation credit is inefficient.* The credit is premised on the belief that people will buy more insulation if the federal government makes it cheaper by granting a tax credit of 20 percent to purchasers. The tax credit philosophy also presumes that high energy prices in the marketplace will not be a sufficient incentive to get people to insulate. In addition, there is an implicit assumption that the supply of insulation substantially exceeds the current demand. All of the assumptions are in error.

In 1975, 9.1 million, or 22 percent, of the occupied, single-family, detached houses added some form of insulation, such as storm windows, attic insulation, wall insulation or weatherstripping. All of this insulation was installed in the absence of any tax incentive. Moreover, the number of people insulating their homes has been rapidly increasing. The number of storm windows installed in 1975 was 11.1 percent higher than the number added in 1974.[1]

People are already stampeding to install insulation, and they are doing so because it makes economic sense. Price is the only incentive needed for action. The high price of energy in the market place has sent a clear signal to citizens about the importance of conservation. Two recent studies demonstrate the point:

According to a study by the National Bureau of Standards, the owner of a small (1,200 square feet), single-story house with wall insulation and weatherstripping in Washington, D.C. could economically invest between $461 and $731 in storm windows and attic and floor insulation depending on the price of energy ($0.45 per BTU for cooling and between $0.15 and $0.45 for heating).[2]

A Congressional Budget Office study estimates that the energy dollars saved by consumers will exceed insulation costs by a benefit-cost ratio of about 3:1. In other words, the fuel savings are three times the insulation costs.[3] With such substantial savings already coming from insulation, the sensible and obvious step for taxpayers to take is to insulate their homes.

Defenders of the tax credit argue, however, that some people are so slow to recognize this logic that they need a tax credit to awaken them to the importance of insulation. This is a "Rip Van Winkle" argument for the credit, and it is nonsense. *If* a taxpayer is smart enough to know about the tax credit, *if* he is smart enough to fill out the tax form, then he will also be smart enough to know that his energy bill is going up and that he had better do something about it. It is difficult to believe that significant numbers of people likely to use the credit are unaware of the savings from insulation, when, as noted, so many people are already insulating their homes without the benefit of the credit.

One of the most complex issues in evaluating the insulation credit is estimating how many *additional* people will insulate their homes *because* of the credit who would not have insulated their homes otherwise. The Congressional Budget Office estimated that the President's proposed insulation credit[4] would increase the $6.3 billion that would be spent without the credit on insulation and related materials over the next 7 years by $2.9 billion. The study estimated that 7.8

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[1] "Energy Program 7, Energy Tax Proposals Relating to Residential Conservation," pamphlet prepared for the Committee on Ways and Means by the Staff of the Joint Committee on Taxation, June 3, 1977, p. 9. Henceforth this pamphlet will be referred to as "Energy Program 7."

[2] "Energy Program 7," p. 4; S. R. Peterson, "Retrofitting Existing Housing for Energy Conservation: An Economic Analysis," (National Bureau of Standards, Department of Commerce, 1974), pp. 28–40.

[3] "Energy Program 7," pp. 16–17 and "President Carter's Energy Proposals: A Perspective," by the Congressional Budget Office, May 31, 1977.

[4] In his Message to Congress on April 20, 1977, President Carter proposed a two-tiered tax credit equal to 25 percent of the first $800 of expenses for residential insulation and 15 percent of the next $1,400 of expenses, for a total credit of $410. The House-passed bill dropped the two-tiered concept.

million of the 23.8 million households expected to make insulation improvements over this period would be induced to do so by the proposed credit; 16 million of these households would make the improvements by 1985 in any event.[5]

The CBO estimate may be reliable, but it is not much more than an intelligent guess. My own guess would be much lower, because I would attribute future increases in insulation more to higher energy prices than to the tax credit.

In addition, in the case of fiberglass insulation, any increase in demand is immediately confronted with supply shortages. Three firms manufacture 85 percent of the fiberglass insulation: Owens-Corning, Johns Manville and Certain-Teed. According to a recent study by the Council on Wage and Price Stability, these firms are already working at peak capacity.[6] The Council states that prospects for increasing imports or switching to other forms of home insulation are not good. While there is less of a supply problem with storm windows, the demand is already high here as well.

It is therefore impossible to predict with any accuracy how many additional people will insulate their homes because of the tax credit. Since we cannot predict how much more insulation will be installed, we also cannot predict how much energy will be saved by the tax credit.

2. *The insulation credit is inflationary.* As pointed out in the preceding section, the Administration's Council on Wage and Price Stability has criticized the insulation tax credit because the three firms which make most of the insulation in this country are already working at capacity. As a result, the Council said, the credit would simply increase demand for the same supply, and thus force prices up. Much of the value of the credit to taxpayers would thus be eaten up in higher prices.

The Council concluded that "the chief beneficiaries of the tax credit this year would be the manufacturers of fiberglass insulation."[7] Although the Council felt that plant additions planned by the fiberglass industry might be able to accommodate the increased demand within 18 months, in the meantime, prices would be pushed higher. Once prices go up, it is difficult to believe that they will ever come back down, especially since demand has been growing steadily. The net result of the credit may simply be to encourage the dominant firms in the industry to raise their prices even more rapidly, in effect "capturing" the value of the credit from the average citizen.

3. *The insulation credit is inequitable.* Although tax credits are more equitable than deductions, many homeowners will not be able to spend the full $2,000 on insulation, even if they know they will get $400 back from the federal government; they will still be out of pocket $1,600. As a result, only those who can afford $1,600 of insulation expenses will get the full advantage of the credits.

In addition, low income homeowners will receive little or no benefits, since the credit is not refundable—i.e. it is not available to taxpayers unless they have tax liability.[8] Thus those who need the most help to insulate their homes will get the least aid—and wealthier families, who have less need for the aid, will get the full value of the credit.

Statistics show that the amount of insulation installed by upper income groups is far greater than the amount installed by lower income groups.[9] The tax credit will increase this discrepancy by subsidizing the rich excessively, while discriminating against those too poor to pay significant taxes. The poor will also suffer from the fact that the price of insulation will be forced up by any increased demand stimulated by the credit among the more affluent.

Finally, millions of persons who have already insulated their homes will receive no benefit from the credit. Yet their neighbors who procrastinated about insulating, will enjoy the benefit of the Treasury subsidy. Why should citizens who practiced sensible energy conservation at the right time get nothing, while those who delayed get the credit?

4. *The insulation tax credit is complex.* Many people mistakenly think that a tax credit is less complex than a direct expenditure program. But an insulation

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[5] See footnote 3.

[6] Council on Wage and Price Stability, "Council Fears Price Increase in Fiberglass Insulation," June 14, 1977.

[7] *Id.*

[8] As a result of the Tax Reduction and Simplification Act of 1977, a family consisting of a married couple with two children does not incur a tax liability of $400 until its adjusted gross income reaches about $10,000. If the credit were refundable, a family with tax liability of, say, $100 could receive a Treasury refund of $300 if it qualified for the full $400 credit; under the House-passed bill, the family would get only $100 of benefit from the credit. Families with no tax liability (those with adjusted gross income of about $7,000 or less) will get no benefit at all from the credit.

[9] "Energy Program 7," pp. 10–11.

tax credit is not less complex. Either revenue agents or officials from another agency will be climbing stairs to determine whether a claimed Federal subsidy is being used for insulation or for a new attic playroom. Moreover, use of the tax expenditure route will actually increase the bureaucracy involved in the subsidy. The tax credit will require bureaucratic negotiations between the Internal Revenue Service and the departments of Treasury, Energy, and Housing and Urban Development. In a direct expenditure program, the Treasury and the IRS would have no part to play in the program, thus simplifying its administration.

Supporters of the insulation credit argue that there will be less red tape with a credit than with a direct expenditure. This is only true if there is less supervision under a tax credit than under a direct expenditure program. As has been pointed out:[10]

Not only is the myth about "less red tape" untrue, but the utilization of the tax system to implement socio-economic goals places on the Internal Revenue Service responsibility for implementing and enforcing regulations dealing with a highly technical area in which that agency has little or no expertise. It is simply illogical to assign to the Internal Revenue Service matters more properly suited to the Federal Energy Administration, the Department of Housing and Urban Development and the Energy Research and Development Administration. But IRS jurisdiction over these areas of administration is the inevitable result of an attempt to fuse social or economic programs onto the tax system.

Similarly, the argument that tax credit programs are simpler and easier to administer than direct appropriations is likewise untrue. The relative simplicity or complexity of the program depends more on the particular characteristics of the goal to be achieved, and the means by which it is to be achieved, than on the form of the program (tax credit versus direct appropriations). In regard to the home insulation and residential solar energy equipment credits, the basic contours of the program would be the same if a direct subsidy were used instead of a tax credit program. The proposal could be as complex or as simple as deemed necessary to achieve the goal, whichever form were utilized It thus appears that this alleged advantage of tax credits is not inherent in a tax expenditure program any more than in a direct expenditure approach.

Finally, the irony should be noted that at a time when simplification is a basic goal of tax reform, the insulation tax credit will make the system more confusing and complex. Many taxpayers will be unaware of the credit itself or of the requirements for qualifying for the credit. As a result, they will not keep the necessary records that the IRS will demand for substantiating the credit. It will cost the IRS millions of dollars to thoroughly audit this new item on the tax form. If the IRS chooses not to audit the item thoroughly, many more millions of dollars will be lost to taxpayers claiming the credit who do not deserve it—one more burden on the IRS in the increasingly serious problem it faces of "audit roulette."

5. *The insulation credit is expensive.* The credit is not cheap. It will cost the Treasury a total of $4.1 billion by 1985, or approximately $500 million a year over the life of the credit. This $4.1 billion will increase the federal deficit and impair the goals of balancing the budget, providing across-the-board tax relief, and meeting other urgent domestic needs. If Congress wishes to spend money on energy conservation, there are many less expensive and more effective ways of doing so than by enacting a wasteful and inefficient insulation tax credit.

In sum, the home insulation tax credit should be rejected by the Senate. Increased oil prices have already made clear to consumers that they should insulate their homes. Because they can save money on their fuel bill by insulation, the market mechanism already provides a strong incentive to insulate. Average home insulation costs can be recovered in a few years, through the resulting savings in heating and cooling costs. There is no need for government subsidies in the form of tax expenditures—and certainly not through a tax credit that is grossly inefficient, inequitable, inflationary, complex and expensive.

THE SOLAR AND WIND ENERGY TAX CREDITS FOR RESIDENCES

As in the case of insulation, advocates of tax reform do not oppose the sun and the wind. But the popularity of tax credit proposals for solar and wind energy equipment borders on a superstitious belief in the efficacy of the tax code for accomplishing the impossible.

[10] Steven D. Moore, "A Critique of Insulation and Solar Energy Tax Credit Proposals," *Tax Notes*, April 18, 1977, pp. 15–20.

THE SOLAR ENERGY TAX CREDIT

The proposed solar energy tax credit for residences is a mistake for several reasons:

The technological problems blocking solar energy development cannot be solved by tax credits for purchasers of home equipment.

Solar energy heating is currently much more expensive than alternative sources of energy.

Only well-off individuals are likely to benefit from the credit.

Tax returns and the IRS audit process will be further complicated by the credit.

The credit will cost over $100 million a year by 1983.

H.R. 8444 provides a tax credit equal to 30 percent of the first $1,500 of "qualified" solar energy expenditures and 20 percent of the next $8,500 in such expenditures. Thus, the maximum tax credit is $2,150 on the first $10,000 of expenditures. As in the case of insulation, the credit is available for expenditures between April 28, 1977 and the end of 1984.

There are five major objections to the credit:

1. *The solar energy credit is ineffective.* Solar energy today is not an economical source of energy in most parts of the United Sttaes. The technological problems involved in recovering solar energy at reasonable cost have not been solved. If the Federal Government is to become involved in the effort to develop solar energy, it should do so through direct appropriations that can be focused on the search for answers to these technological problems, which now block the recovery and use of solar energy.

Granting tax credits for the installation of home solar energy equipment is not an effective way to spur the needed research and development effort. Most of the benefit of the credit will be wasted on individuals who are fortunate enough to live in areas with a large number of sunny days each year, and who already find the use of solar energy to be practical. They will get a government tax subsidy for doing what they would already have done in any event. Meanwhile, the research and development programs that are needed to make solar energy practical in the rest of the United States are less likely to be undertaken, or may be undertaken with inadequate funds.

The best way to develop solar energy is to concentrate on the technical problems that actually block its use. The proposed tax credit is ineffective because it fails to do so.

2. *The solar energy credit is inefficient.* Use of solar energy is a worthy goal, but it should be pursued in an efficient manner. Before the invention of small electric motors and the incandescent lamp, it would have made little sense to grant government incentives to encourage people to put electricity in their homes. The comparable statement on solar energy is equally cogent today.

The Treasury Department has examined the cost effectiveness of various heating systems and has found solar energy to be the least efficient. See Table 1. Among other things, solar energy requires installation of an alternative heating system for use as a backup, when the sun does not shine.

For a homeowner in a 20 percent marginal tax bracket, the total costs over a 20-year period of heating an average home are shown by the Treasury study to be $12,907 for a solar system, $3,659 for an oil system, and $2,582 for a gas system. Thus, the solar system is from three and a half to five times as expensive as alternative systems. Since the benefits of each system are similar, the solar system is one-fifth as cost-effective as gas heat and less than one-third as cost-effective as oil heat.

TABLE 1.—COST OF HEATING AN 1,850 FT² HOUSE OVER A 20-YR PERIOD [1]

Type of heating system	Homeowner's marginal tax rate	
	20 percent	50 percent
Solar	$12,907	$12,068
Electric furnance	5,440	5,363
Electric resistance	4,968	4,906
Oil	3,659	3,546
Gas	2,582	2,525

[1] "Solar Heating," Office of Tax Analysis, U.S. Department of Treasury, Apr. 8, 1976. Figures are based on the present value of installation and operating costs, assuming that the investor's after-tax rate of return is 10 percent, and that 80 percent of the cost is financed by an 8-percent loan, the interest on which is deductible.

Assuming a solar system with an electric baseboard backup system, a 20 percent marginal tax bracket homeowner would need a 69 percent credit to make solar heat competitive with oil, and a 77 percent credit to make it competitive with gas. If a credit were allowed only on the solar system (and not on the backup system as well), the corresponding figure jumps to 83 percent for a 20 percent bracket taxpayer considering gas heat as an alternative. The need for such absurdly high tax credits shows clearly the costly and inefficient character of a solar heating system. There is no justification for federal tax subsidies for such costly and inefficient systems.

3. *The solar energy credit is inequitable.* To take full advantage of the proposed solar energy credit, a homeowner must spend $10,000 under the House-passed bill. It is true that a taxpayer with sufficient tax liability is eligible to receive $2,150 of this cost back from the government as a result of the tax credit.[11] But who except the upper income homeowner can generally afford to spend nearly $8,000 for solar equipment? The credit clearly becomes a subsidy for the well-off homeowner, who is likely to install the equipment even without the credit. The benefit of the credit will be confined to a relatively small group of homeowners in the upper income brackets. The credit is thus an "upside down" subsidy that favors higher income taxpayers and discriminates against lower income taxpayers.

4. *The solar energy credit is complex.* Taxpayers are having more difficulties every year filling out the tax return form, and the Internal Revenue Service is having greater difficulty auditing returns. Enactment of the solar energy credit will require more lines on the tax return, even if the credit is claimed by only a few individuals, causing confusion for most taxpayers. Tax returns need to be simplified, not made more complex.

All of the arguments given above against the insulation credit also apply to the solar energy tax credit. In particular, the "bureaucratic inefficiency" argument applies to both the insulation and the solar energy credits.[12]

5. *The solar energy credit is expensive.* The revenue loss from the solar and wind energy credits will amount to over $150 million a year by the end of 1984, and the total cost to the Treasury over the entire seven-year period is estimated at $720 million. Moreover, as the technical problems of solar energy are solved, more people will purchase solar energy equipment, and the cost to the Treasury of the tax credit will rise. Thus, although the credit fails to spur energy research now when we face difficult technological problems, it constitutes a fiscal time bomb set to go off in future years when those problems are solved and government help is no longer needed. Such "wedge" provisions are presenting increasingly serious problems for the Federal budget process, since they enter the budget with low costs in their early years, then mushroom in later years.

Technically, the House bill scheduled the credit to expire at the end of 1984. But any tax benefit creates a special interest constituency, which works to prevent the termination of the tax subsidy to which it has become addicted. There is no reason to think that a solar energy credit would be different. The industry will become dependent on the tax subsidy and argue that to take the credit away will cause withdrawal pains which will kill the patient.

For these reasons, the solar energy credit should be rejected. By failing to concentrate on the problems that demand a solution if the sun is to become a practical source of energy, the credit wastes government funds. It is inefficient, because it spurs a form of heating that is currently much more expensive than other forms. And it is inequitable, because it will benefit only homeowners who can afford the high cost of solar energy equipment.

If energy conservation and development measures are needed, they should be funded through direct appropriations. As the Manhattan Project and the Apollo Program demonstrate, projects funded through direct appropriations show results, and outlays are cut when the project has achieved its objective.

In contrast, programs funded through the tax system go on and on, and there is rarely any effective review of the results, or any end to the costs and the drain on the Treasury. The proposed credit for solar energy equipment should be rejected.

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[11] A married couple with two children does not incur a tax liability of $2,150 until its adjusted gross income reaches about $20,000. Since the credit is not refundable, low income taxpayers will not receive any benefits from the credit, and many middle income taxpayers will not receive the full benefit of the credit. See footnote 8.

[12] See footnote 10 and the accompanying text.

THE WIND ENERGY TAX CREDIT

Advocates of tax reform have sometimes been compared with Don Quixote, dreaming his impossible dream.[13] The House-passed bill promotes the image by giving them an actual windmill to tilt against. Long ago, persons learned to harness the wind through windmills, and they have been doing so ever since, whenever it was an economical source of energy. The windmill was invented and used for centuries without a tax credit subsidy, and it will continue to be used if the credit is not enacted.

Like the insulation and solar energy tax credits discussed above, the wind energy tax credit,[14] is inefficient, inequitable, expensive, and complex. The defects that impair the other credits also apply to the wind energy credit.

The credit is a windfall for windmills. The tax benefits will go largely to those who would install windmills in any event. Only the very wealthy will have enough money to buy such equipment, and will have enough tax liability to benefit from the credit. The money spent on this credit could be much better used on serious programs. The wind energy credit is extravagant, and will create complicated regulations, forms and instructions which will only confuse taxpayers, and it should not be included in the energy legislation enacted by Congress.

ELECTRIC CAR CREDIT

The House-passed bill also contains a tax credit of $300 for the purchase of new electric motor cars. Currently, electric cars are being purchased as fast as they are built; consequently, there is no need for a credit to stimulate demand. In addition, electric cars are energy inefficient. Rather than burning energy directly, they must obtain electricity from a utility, which must first burn fuel (oil, gas, nuclear material, or coal), heat water, turn turbines, create electricity, and transport it by wire to the consumer. Each of these stages loses energy. The electricity must then be stored in the car batteries which by their nature also lose energy. A logical energy program would not give a tax credit to electric cars. It would put an excise tax on them like the one put on inefficient automobiles powered by gasoline.

BUSINESS ENERGY TAX CREDITS

Another measure in the House bill that unwisely expands the use of tax expenditures is the so-called "business energy tax credit"—an extra tax credit of 10 percent proposed for a wide variety of business investments which are thought to promote a rational energy policy. The revenue loss estimated from the credit is about $500 million a year.

The kinds of items eligible for the new credit are:

Investments to use fuels other than oil and gas;

Investments to expand cogenerative capacity;

Investments in business insulation;

Investments in equipment to use advanced energy technologies (solar, geothermal and wind) in connection with existing buildings or plants;

Investments in equipment to use energy more efficiently when installed in connection with existing industrial or commercial facilities; and

Investments in pollution control equipment required for shifting from oil or gas to a substitute material.

From an economic standpoint, there is some support for the idea of subsidizing equipment that reduces the use of oil and natural gas, because we are continuing a price policy which results in users paying less than the marginal cost for fuel. Using more oil means that we increase our imports; in effect, the import price is the marginal cost.

The main point at issue is whether it makes sense to carry out this subsidy policy through the tax law, by making it a new investment credit.

A major problem of the tax expenditure approach is that it adds considerably to the complexity of the tax law. Investments qualifying for the new credit must meet performance and quality standards prescribed in consultation with the

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[13] George F. Break and Joseph Pechman, *Tax Reform: The Impossible Dream* (Washington, D.C., The Brookings Institution, 1975).

[14] The amount of the tax credit in H.R. 8444 for residential wind energy equipment is the same as for solar energy equipment—30 percent of the first $1,500 spent and 20 percent of the next $8,500, for a maximum credit of $2,150.

Secretary of Energy. The tax accountants and the Internal Revenue Service auditors will have difficulty deciding if a regenerator or a recuperator meets an esoteric test stated in BTU's per hour. They will also have to determine whether the new equipment is used in connection with a process which was being carried on as of April 20, 1977. We already have tax lawyers and tax accounts. Now we will need tax engineers.

It is in areas like these that the error inherent in using the tax law to implement a Federal subsidy stands out most clearly. The basic policy that is being implemented is a remarkably complex one that involves highly sophisticated technology. The policy is being implemented through a structure, the tax system, in which the people involved, including the administrators, are not familiar in any detail with what is involved.

Moreover, one subsidy rate—a 10 percent tax credit—is being established for a variety of very different conservation investments. The credit applies to replacement equipment in a plant that has been burning fuel for years. The same credit applies to a firm that makes a highly innovative investment in solar energy to replace natural gas. In effect, in spite of wide differences and circumstances, the tax credit asks every business to wear a size 10 shoe.

In addition, there is no coordination between other subsidy efforts in the energy area and the new tax credit. In recent years, the Federal Government has been heavily engaged in subsidizing research and pilot operations in new energy technologies. The new tax credit applies at the flat 10 percent rate, whether the installation is of a type already being subsidized or a type which is now standard.

Again, the tax subsidy is applicable only to old buildings and existing processes. If subsidizing industrial energy conservation were a sensible step to take it would certainly be sensible to apply it for new buildings and new processes. The reason for the distinction is that, applied to new buildings, the provision would be too complicated. It would involve a highly specialized calculation to guess how the new plant would have been built, and then how this hypothetical design was moderated to introduce more energy efficiency.

Another aspect of the basic inefficiency that arises from the effort to implement a complex energy policy through the tax law is that it leaves little opportunity for government to learn from the process. If the Department of Energy were subsidizing the use of equipment to conserve oil and gas, particular efforts would be made to develop pilot projects for equipment that showed promise of further development. Evidence could be accumulated on the performance of various types of equipment, and this information could be fed into a long run program for energy research and development. But no such planning and follow-up is likely under a subsidy program administered by the IRS.

Finally, the tax approach to energy subsidies will introduce a new layer of eligibility conditions that have nothing to do with energy. The investment credit for energy related investments will only be available to a taxpayer who has sufficient income to utilize the full investment credit.

In 1971, over one-quarter of the corporations that had earned the regular investment credit did not have sufficient tax liability to use all of their investment credit. Out of 381,000 corporate tax returns with tentative investment credits, 103,000 finished the year with unused credits. At that time the investment credit rate was 7 percent. It has since been raised to 10 percent, and the new credit will be on top of the credits presently available.

The House bill attempts to deal with this problem in some cases by allowing a "100 percent fill-up" against tax liability for the new credit.[15] But this device does not help many small firms, new firms, rapidly growing firms, firms hurt by the recession, and other firms which have no tax liability and which will therefore obtain no benefit at all from the credit. This situation clearly illustrates one of the basic defects of tax subsidies—such subsidies disqualify many potential recipients on the basis of their specialized tax circumstances, although such circumstances have nothing to do with any proper qualifications for the Federal subsidy. In fact, the hit-and-miss effect of the tax subsidy will put many firms at a competitive disadvantage—energy conservation equipment will cost them 100 cents on the dollar, whereas their competitors can use the

[15] The maximum offset allowed for the 10 percent investment tax credit under present law is $25,000 plus 50 percent of tax liability over $25,000. The House bill allows the new credit to offset 100 percent of tax liability in certain cases.

credit to purchase the same equipment for 80 cents on the dollar, as a result of the 10 percent discount available through the investment credit in current law and the additional 10 percent credit proposed under the House bill.

If some additional governmental encouragement for installing energy conservation equipment will advance the country's energy program, the purpose is not served by structuring the incentive in a way that disqualifies a large proportion of firms from participating in the subsidy and puts them at a substantial disadvantage with their competitors.

In summary, the proposed business energy tax credit, like the other proposed tax expenditures, is a wasteful and complex approach to an important national problem. If we are serious about bringing order to the Federal budget process, we must analyze our subsidy policy with a critical eye and eliminate subsidies that are not designed to give us our money's worth. A new investment credit for a melange of so-called energy conservation investments is not an appropriate answer.

THE RECYCLING INVESTMENT CREDIT

The House bill revives a proposal that the Senate wisely rejected in the Tax Reform Act of 1976, an additional investment credit for waste recycling equipment.[16]

This proposal continues to show signs of life, because the tax law already provides large subsidies for the production of *new* materials through provisions such as the percentage depletion deduction, the current "intangible" deduction for oil and gas well drilling and mine development expenses, and the allowance of capital gains treatment for some of the gain from growing and cutting timber.

These tax benefits for producing new materials will to some extent stimulate their production, which means an increased supply and a lower price.

Recycling used iron, aluminum, paper, or other materials are expensive processes which will only be undertaken to the extent they successfully compete with new production. While the tax law is responsible for artificially reducing the price of new materials, it is simultaneously creating a competitive handicap for recycling.

In this situation, a recycling credit purports to restore a competitive balance. Although the diagnosis may be valid the remedy is an improper cure. The technique of balancing loopholes by spreading them to more producers can only further undermine the tax system. Moreover, the concept of recycling is extremely vague and broad, since it covers in principle any by-product recovery process.

One of the most harmful aspects of our present tax law is the pervasive across-the-board inducement for business to use up scarce materials.

If two products are in competition, and one is made from a valuable resource while the other is made from a cheap, almost valueless resource, our tax law, through percentage depletion, reduces the tax on the valuable resource-using process. In effect, the tax code penalizes processes that conserve valuable resources by using substitutes.

The fact that the percentage depletion subsidy applies to producing natural resources but not to recycling scrap is only one aspect of this basically unsound anti-conservation penalty. In effect, because percentage depletion applies only to the value added in extracting minerals, it penalizes the value added in manufacturing. It favors the income of owners of natural resources and penalizes income generated by manufacturing.

The recycling credit partially offsets a small part of this pattern of tax subsidies, but it does not deal with the basic problem. As a practical matter, the thrust of the recycling credit is to bring another group of lobbyists on board the depletion bandwagon. A new tax benefit would exist, available to those whose closest competitors enjoy the percentage depletion subsidy. Still another set of opponents to the repeal of percentage depletion would be created.

The average citizen should be concerned over a bill that blithely creates new tax loopholes, when the public is indignant about the loopholes that already exist. An important source of President Carter's commitment to tax reform is his opposition to existing tax loopholes. To use existing loopholes to justify new loopholes is simply to compound the serious problem that already exists.

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[16] The bill provides a 10 percent investment tax credit, in addition to the 10 percent credit already available under existing law, for the purchase of equipment to recycle solid waste and to sort and prepare such waste for recycling. The cost of the credit is estimated at approximately $30 million a year.

The House bill is also extremely vague in its recycling provisions. It devotes four lines to the definition of recycling equipment as "any equipment which is used exclusively in the recycling of solid waste or to sort and prepare solid waste for recycling."

Any manufacturing or mining process which has a primary product will have some refuse which, unless it were "recycled" to become a by-product, would be solid waste. In such cases, many businesses already have highly profitable operations to create by-products from what otherwise would have been waste.

How would the new credit for reprocessing "waste" apply in practical cases?

If a firm has been producing the by-product for years and replaces its by-product machinery, does it obtain a credit?

If a firm stops its by-product production for a month and has solid waste and then goes back to recycling the "waste," does it obtain a credit?

If a firm undertakes a new manufacturing process and tells the revenue agent it will throw away its waste unless it is allowed a tax credit for equipment to recycle the waste into a by-product, as its competitors are doing, does it obtain a credit?

The basic problem underlying these examples is that there is already a large number of business activities which are appropriately described as "recycling waste." Most of these are profitable by-product lines of business, and there is no case to justify a tax subsidy for processing that is going to take place anyway.

In addition, there are situations where, under present conditions, recycling waste is not efficient. This inefficiency may be artificial, such as in cases where a firm is not charged the full cost for disposal of solid waste, or where recycled materials compete against materials whose price has been pushed down by percentage depletion.

The most sensible government strategy with respect to recycling is to provide encouragement for recycling efforts that are efficient. It does not make sense to spend—in real resources plus tax expenditures—$10 to recover $2 of material. It also does not make sense to subsidize recycling that will take place in any event.

One way to eliminate artificial inefficiencies is to charge the full cost for business waste disposal. Another way is to eliminate the tax subsidies for percentage depletion and deductible development costs which push down the price of virgin materials. If we do go the subsidy route for recycling, the vagueness of the concept makes it indefensible to place this subsidy in the tax laws, where it will be up to revenue agents to decide what recycling is to be subsidized. The only efficient way to handle a subsidy is to assign it to an agency with expertise in the waste disposal area. Such an agency would at least be able to make informed judgments about what types of recycling should be subsidized. This direct subsidy approach would also make it possible to subsidize new technology in the area and develop cost breakthroughs that could reduce the national problem of waste disposal.

TAX INCENTIVES FOR GEOTHERMAL ENERGY PRODUCERS

The tax provisions of H.R. 8444 also expand some longstanding tax loopholes on the pretext of "encouraging" producers of energy from geothermal steam.

Specifically, the House-passed bill extends to this relatively new energy source the advantage now given oil and gas producers to deduct currently most of their capital costs—the so-called deduction for intangible drilling expenses. In addition the House bill extends percentage depletion, at a 10 percent rate, to geothermal steam, though on a restrictive basis, since the total amount of depletion may not exceed the cost basis of the property. The estimated revenue loss from the provisions is $192 million through the end of 1984.

Three points should be made about the new deductions proposed for geothermal energy:

Because the new tax benefit is in the form of a deduction, its benefits will go primarily to very rich investors.

The form of the new tax benefit makes it very unlikely that it will lead to any increase in available geothermal energy resources.

While taking significant steps toward market incentives for currently important energy resources—oil, natural gas, and coal—the bill takes no action to eliminate the unnecessary and unwise tax incentives now provided for these resources; instead it uses these existing loopholes as models for new loopholes for geothermal energy.

1. *The geothermal tax benefit primarily helps rich investors.* The technique that the House bill adopts to encourage geothermal energy development is an enhanced tax deduction. As a deduction, it becomes more valuable as the tax rate increases on the income against which the deduction is taken. As a result, the new deduction primarily benefits rich investors in the upper income brackets.

In recent years, Congress has made increasing use of the tax credit device, as opposed to a tax *deduction*, when it is desired to provide special tax incentives for various activities. In the 1960's the investment credit was enacted to promote business investment in equipment and machinery. In other provisions of H.R. 8444, tax credits are used to encourage home insulation and solar energy. The major advantage of the *credit* approach is that it provides an essentially uniform benefit for taxpayers in each bracket.

However, the technique that the House bill adopts for geothermal wells is a form of highly accelerated depreciation deduction for capital costs. The thrust of the bill is brought out by comparing an investment in a geothermal well with a 20 year life to investment in a machine with a 20 year life:

Using the double declining balance method of depreciation, the annual depreciation deductions on the machine are worth 54 percent of the value of the same deductions taken entirely in the first year.[17] By providing a 100 percent deduction in the first year for the costs of geothermal wells, the House bill allows, in effect, an extra deduction of 46 percent of the cost of such wells.

Put another way, under the 48 percent corporate tax rate, the accelerated deduction for geothermal wells in the House bill is equivalent to a tax credit of 22 percent.[18] For a taxpayer in the 70 percent bracket, the equivalent tax credit is 32 percent. For a taxpayer in the 20 percent bracket, the equivalent credit is only 9 percent.

The House bill will have the effect of expanding into a new area the sort of investment tax shelter abuses that have come to be associated with oil and gas well-drilling expenses. These shelters are a special preserve for wealthy investors. Ironically, the bill applies the minimum tax to this new tax preference. The minimum tax is a modest 15 percent tax on income from tax loopholes. This House action itself shows that the provision on geothermal wells would simply open up a new tax loophole, which will be subject to all of the tax shelter manipulations of the present intangible deduction for oil and gas. But coverage under the minimum tax does not cure the basic defect of a new tax preference for wealthy investors. It is only a 15 percent slap on the wrist for such investors whose income from tax loopholes is so large that it triggers the minimum tax.

2. *The geothermal tax benefit is an inefficient subsidy.* The new allowance for deducting intangible drilling expenses on geothermal wells will make very little contribution to finding new sources of geothermal energy. This result is clear from the experience with intangible drilling expenses for oil and gas.

Oil and gas industry representatives constantly stress the risk involved in exploratory drilling for new deposits. Numerous scientific techniques are used to indicate the existence of underground rock structures that may contain oil and gas, but only drilling will prove the existence of such resources. It is commonly said that only 1 in 10 "wildcat" wells discovers oil, and that only 1 in 30 such wells finds oil in commercially profitable amounts.

Under normal tax principles the full cost of a dry well is deductible in the year it occurs as a normal business loss. So far as *exploratory* drilling for oil and gas is concerned, therefore, almost all of the drilling expenses would be deducted in the first year in any event. Thus, the allowance of a current deduction for all intangible drilling expenses does very little to improve the tax treatment of wildcat drilling.

With respect to oil and gas, the intangible drilling expense loophole is primarily a subsidy for *development* wells. Three out of four development wells are successful. Except for the unjustified deduction provided by present tax rules, costs of these wells would have to be deducted gradually over the life of the wells. In fact, under proper accounting theory, even the cost of *unsuccessful* develop-

[17] Speeding up the taking of a deduction is equivalent to increasing its amount, and postponing a deduction reduces its amount. The calculation assumes a discount rate of 10 percent, since a normal equity investment rate of return is 20 percent before tax and 10 percent after tax. The present value of the accumulated future-year deductions for depreciation of the machine under the double declining balance method of depreciation is worth only 54 percent of the cost of the machine.

[18] Calculated as (100 percent − 54 percent) × 48 percent = 22 percent.

ment wells should be spread over the life of the particular field in which they were drilled, since the one-in-four development wells that are dry represent one of the normal costs of exploiting the entire oil or gas field.

The tax subsidy for development wells is especially bizarre, because if left to themselves oil and gas producers would ordinarily drill too many development wells. Under the usual patchwork of land claims, there is an economic incentive for each land owner to drill more wells and draw out his oil and gas, before neighboring landowners do the same thing. As a result of this "market" incentive for excessive drilling, States have developed conservation laws to limit the amount of development drilling, such as by requirements of minimum spacing between wells. In effect, States are trying to limit activities for which Congress is providing a special subsidy.

At this time we know little about the technology of geothermal deposits. We can say confidently, however, that drilling to find new deposits will involve far more risks than drilling to exploit a discovered field. It follows that the proposed new deduction for intangible drilling will do little to improve the tax treatment of exploratory drilling, while providing a tax bonanza for producing wells in fields already discovered.

If Congress desires to provide a serious incentive for geothermal energy, it should design a direct subsidy to pay bonuses for exploratory drilling. It certainly should not create a tax windfall for rich investors to conduct more development drilling.

Further, since the deduction technique makes the new tax benefit attractive to rich investors, the House bill is placing this new geothermal shelter into competition with other tax shelter devices in areas like oil and gas, real estate and farming, as well as with capital gains, tax exempt interest, etc. This piling up of attractive investments for a limited class of rich investors is a further indication that the bill will have little effect on developing a new energy source that could be important to the nation.

3. *A percentage depletion deduction for geothermal energy is unjustified.* The House bill extends the percentage depletion allowance to geothermal energy sources in an unusual way. Geothermal energy is to receive a 10% depletion allowance, but the amount of depletion taken by a taxpayer under this provision is not permitted to exceed the cost basis of the property.

This "basis" rule represents a modest step to curb the well-known abuses of percentage depletion. The mischief in the customary percentage depletion allowance is that a producer of minerals can write off, as intangible development expenses, most of the capital cost, and then use the depletion allowance to subtract from his income a continuing annual percentage of gross receipts which is not limited to the remaining unrecovered cost.

For example, the cost of developing an oil field might be $1 million, of which $800,000 could be deducted currently, through the intangible drilling deduction. The percentage depletion deductions could well amount to $2,000,000 or more over the life of the deposit. The total capital costs allowed to be deducted would be three times the actual amount of the capital costs. The example is not unrealistic. Past Treasury studies have suggested that in the aggregate, such deductions exceeded capital costs by about 3 to 1.

If the House-passed provision for percentage depletion for geothermal energy is applied to this example, the percentage depletion deduction would be limited to the amount of the unrecovered capital cost of $200,000. The total deductions would be limited to $1 million, the amount of the capital cost. The defect in the new proposed percentage depletion deduction is that it allows an additional acceleration of the capital cost deduction, which is the same type of loophole involved in the proposed intangible drilling deduction discussed above.

EXISTING ENERGY TAX LOOPHOLES

The House bill is designed to deal in a major way with the entire energy area. It can be seriously faulted, therefore, for failing to deal with the major existing tax loopholes involving energy.

From a long range standpoint, a significant part of the bill is that the price of new oil and gas will be allowed to rise ultimately to market levels. Higher market prices constitute a strong economic incentive both for energy production and for energy conservation. At a time when the nation is moving down the road of higher price incentives, we should be taking the related step eliminating the in-

tangible drilling deduction and the percentage depletion allowance for oil and gas and other minerals.

The hard part of the energy bill is the burden of higher energy prices that is being imposed on American citizens. These citizens are being asked to accept higher prices which will simultaneously enrich some producers and stimulate new production. At a minimum the average citizen should demand in return that Congress eliminate existing and proposed tax loopholes that enrich some producers without stimulating new production.

U.S. SENATE,
COMMITTEE ON APPROPRIATIONS,
Washington, D.C., September 8, 1977.

Hon. RUSSELL B. LONG,
Chairman, Senate Finance Committee,
Dirksen Office Building, Washington, D.C.

DEAR SENATOR LONG: It is my understanding that your Committee will be holding hearings over the next several days on elements of the national energy legislation relating to the proposed crude oil equalization tax. I further understand that testimony will be delivered early next week by representatives of the nation's independent oil refiners.

I have been contacted by refiners in my own state who are extremely concerned over the possible adverse impact on independent refiners resulting from their competitive disadvantage against integrated major refiners who, through access to owned crude oil supplies, would be able to subsidize refining operations via profits made in crude oil production. According to the concern relayed to me, substitution of the entitlements program and its small refiner bias with a crude oil equalization tax without such an offset provision would threaten the very existence of the small independent refiner, who injects a beneficial competitive influence into the market.

These concerns will, I am sure, be more fully developed in testimony by the refiners, but I did want to pass along my interest in the continued viability of small independent oil refiners. It is my hope that the Committee will carefully consider this aspect of the equalization tax proposal in its deliberations.

With kind regards.

Sincerely,

RICHARD S. SCHWEIKER,
U.S. Senator.

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, D.C. August 11, 1977.

Hon. RUSSELL B. LONG,
Chairman, Senate Committee on Finance,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: I commend you for the expeditious treatment that your committee is affording the House passed tax provisions of the National Energy Plan. Early Senate action is essential to national efforts to foster greater energy self-sufficiency.

I am deeply concerned over the features of the bill that are intended to foster energy conservation through producer and user taxes to create higher prices with the resultant revenues going to general tax revenues. Insufficient attention has been given to the development of domestic energy alternatives with these funds.

The United States is currently spending $45 billion annually on imported oil without any assurance of a long term supply. We are also creating a 1 billion barrel strategic reserve system at a Federal cost of about $12.5 billion.

For a similar Federal investment we could construct coal gasification facilities capable of supplying the equivalent of 1 million barrels of oil per day for at least 20 years. By subsidizing new energy supplies and technologies for the differential cost between market prices (for example, of imported oil) and domestic alternatives, we can foster even greater energy supplies from domestic sources.

Your consideration of means to stimulate domestic energy alternatives to oil imports from traditional and unconventional sources, such as coal gasification and liquefaction, solvent refined coal, and oil shale, would be in the national interest. Tax revenues raised from energy usage should be directed to the development of new energy supplies; otherwise after the high prices have been paid, we will be no better off than now from the standpoint of energy self-sufficiency.

With warm personal regards, I am

Truly,

JENNINGS RANDOLPH.

U.S. SENATE,
Washington, D.C., September 14, 1977.

Hon. RUSSELL B. LONG,
Chairman, Senate Finance Committee,
Dirksen Senate Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: We are writing to express our concern about the so-called "user tax" on oil and natural gas which was incorporated in H.R. 8444, the National Energy Policy, as adopted by the House of Representatives. It is our opinion that this tax will serve no energy conservation purpose while resulting in higher consumer prices for millions of Americans. Especially in view of the fact that the Senate and House have already passed similar "coal conversion" bills—which are designed to encourage the utilization of more coal and less use of oil and gas by utilities and major fuel burning installations—it seems inappropriate to penalize existing facilities, many of which cannot be converted to coal in the near term, for continued use of natural gas or petroleum.

In view of this, it is our hope that the Senate Finance Committee will critically examine the "user tax" proposal especially to determine what, if any, energy conservation can be expected to result and what adverse economic impact might result from its enactment. It will be difficult for us to support such a proposal when this matter comes to a vote on the Senate Floor. We believe that there are more effective and more equitable alternatives for achieving energy conservation than this tax.

Most cordially,

RICHARD "DICK" STONE.
LAWTON CHILES.

TESTIMONY OF HON. MARK W. HANNAFORD

Mr. Chairman and members of the committee, in 1974 the Federal Energy Administration instituted the crude oil entitlements program to equalize the price of all crude oil used in the United States. This program was significantly flawed, however, for it failed to recognize the difference in quality in the oil produced in the various geographic areas. In particular, California oil producers were placed at an extreme disadvantage due to the lower quality of California crude oil.

The lower quality of California oil of course means that it is priced lower than competing, higher-quality oil. Thus, the flat of the entitlements is proportionately greater on California; the lower the price the greater the relative burden. Accordingly, the entitlement program has resulted in unfairly depressed prices for lower quality crude oil. The history of the enactment of the Energy Conservation and Production Act demonstrates this. Even though this Act included a provision to adjust ceiling prices for lower quality crude oil, the inflexibility of the entitlements program with regard to quality, gravity, and location differences between different crudes has resulted in California crude not being priced by the market up to the stated ceiling prices.

The institution of a variable tax rate based on oil classification is a mechanism by which the inflexibility of the entitlements program can be circumvented. Congressman Ketchum and I convinced our colleagues in the House of Representatives to amend H.R. 8444 to institute this program in 1978, rather than 1980 as was the case in the original House bill, and thus provided the legislative assurance that California oil can continue to be produced reasonably and profitably.

The combination of unfavorable market conditions for heavy California crude and a fixed entitlement penalty for all crudes regardless of quality has caused

a curtailment of production in California that must be replaced by imported crude at nearly three times the price. The variable wellhead tax, starting in 1978 as specified in the Hannaford-Ketchum amendment in H.R. 8444, will go a long way toward resolving this problem. Failure to include this provision will result in further large-scale curtailment of production.

Gentlemen, I urge you to include this provision in the legislation before you today.

THE WHITE HOUSE,
Washington, D.C., September 30, 1977.

Hon. RUSSELL B. LONG,
Chairman, Senate Finance Committee,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: President Carter asked me to review for you the testimony of Mr. Richard L. Lesher, President of the Chamber of Commerce of the United States before the Senate Finance Committee on September 13, 1977. Our detailed comments are enclosed.

I would like to emphasize a basic point. The Chamber's predictions of economic damage from the National Energy Plan appear to be based on incorrect assumptions. The Chamber assumes most of the wellhead tax will not be rebated, whereas the Administration assumes tax receipts will be rebated. Also, the Chamber underestimates the amount of investment that would be stimulated.

These errors are particularly serious since they lead the Chamber to underestimate gross national product with implementation of the Plan or H.R. 8444. This underestimate, in turn, is a major reason why the Chamber incorrectly argues that the plan would impose a sizeable cost on the average family.

The Administration, independent Congressional offices and private forecasting firms have analyzed the macroeconomic impacts of the National Energy Plan. The Chamber of Commerce is almost alone in predicting such large, adverse impacts.

I appreciate the opportunity to provide you with these comments. My staff stands ready to work with you and your staff on further analyses of this or any other matters. Please let us know if we can be of assistance.

Sincerely,

JAMES R. SCHLESINGER,
Secretary of Energy.

COMMENTS ON TESTIMONY BY MR. RICHARD L. LESHER, PRESIDENT, CHAMBER OF COMMERCE OF THE UNITED STATES

INTRODUCTION

Mr. Lesher, President of the Chamber of Commerce, expressed four general criticisms of the National Energy Plan in his testimony before the Senate Finance Committee on September 13, 1977. He stated that:

The plan lacks incentives for increasing production corresponding to the strong conservation incentives.

The plan will not accomplish its goals.

The reliance of the plan on taxation would seriously dislocate the economy.

The plan would harm the consumer.

Mr. Lesher's testimony concentrated on the latter two points. The Chamber's forecasts of substantial and adverse effects on the overall economy and average family are due, in large part, to two assumptions that we believe to be inappropriate:

The Chamber assumes only a small part of the well-head tax receipts will be rebated; the Administration seeks full rebate.

The Chamber underestimates the investment that would be stimulated, leading the Chamber to overestimate the adverse impacts on the gross national product.

It is these assumptions that lead the Chamber to forecasts significantly different from those prepared by the Administration, independent Congressional Offices and private forecasting organizations which predict that the macroeconomic impacts and per capita costs would be modest.

This review will examine Mr. Lesher's four major points as well as his comments about various specific parts of the plan, some of which will be briefly discussed.

In addition, Mr. Lesher made a number of comments about various specific parts of the plan, some of which will be briefly discussed.

PRODUCTION INCENTIVES

The National Energy Plan provides the highest production incentives in the world for oil exploration and production by allowing the world price for newly discovered oil. The price for newly discovered natural gas provides extensive incentives for exploration and production and any higher price would yield little additional supply response. The incentives for increasing coal consumption provide a substantial impetus for additional coal production.

The Chamber of Commerce proposals would, in reality, provide not additional incentives but additional petroleum profits and cash-flow. The Chamber proposes to allow the petroleum companies to capture for their own use a part of the unearned rent or windfall profit that would result from increasing the prices of already discovered oil and gas. Alternatively, the Chamber supports taxing away this increment of rent but would "plowback" some of the tax in the form of a rebate to the petroleum companies. There is no evidence, however, that cash-flow or inadequate profits constrain production. The Chamber's policies would merely increase corporate profits without engendering any substantial supply response.

The National Energy Plan balances energy conservation and production. As the Chamber points out, the plan implies a 25 percent increase in energy consumption between now and 1985. The plan also, however, would lead to a 33 percent increase in production.

ECONOMIC DISLOCATION

The Chamber of Commerce overestimates the adverse economic impacts of H.R. 8444 and the National Energy Plan. The Chamber overestimated the impact on inflation, especially in the early years. For instance, in 1979, the Chamber indicates that the rate of inflation will be 1 percent higher than it would have otherwise been. However, in 1979, the only portion of the program that would have noticeable effects on the price would be the crude oil equalization tax which could not have nearly such a large effect.

Also, the Chamber's forecast implies that business investment will be reduced by the proposals. However, the program will almost surely increase investment as a result of the rebates from the oil and gas consumption tax, the tax credits for conservation, and the coal replacement program. The Chamber's conclusion appears to be due to a failure to adjust the money supply in the forecasting model. Also, in its analysis of the NEP the Chamber assumes the standby gasoline tax will be triggered.

Most important, the Chamber assumes only a small portion of the crude oil tax receipts will be rebated to the public. It appears that using the Chamber of Commerce's model this leads to a substantial reduction in the deficit, a severe fiscal drag on the economy, and a sharp decline in the gross national product. The Administration supports a full rebate in which case this drag would not be present and the economic impacts would be modest.

In sum, the Chamber's estimates of economic dislocation appear to be based on some misunderstandings of both the National Energy Plan and in H.R. 8444. They do not agree with either the Administration's estimates of economic impacts or those of other independent analysts such as the Congressional Budget Office, Data Resources, Inc., and other forecasters.

CONSUMER IMPACTS

The Chambers estimate that the H.R. 8444 would cost $7,000 for every American family of four and the Administration's program would cost $15,000 for every family of four is, to a considerable extent, based on the computations analyzed above. The Chamber allocates its estimated overall macroeconomic effects to households. In particular, the Chamber appears to have assumed that the taxes that the Administration proposes to rebate will not be rebated.

A major difference between the Chamber's estimate of H.R. 8444 and the NEP is that the Chamber's estimate for the latter assumes a triggering of the standby gasoline tax originally proposed by the Administration, but rejected by Congress. The Administration's basic estimates assumed the tax would not be triggered.

ACCOMPLISHMENT OF GOALS

Various studies have reached different conclusions about the savings that would result from the plan but it is not the case that all have concluded that the plan's goals can not be reached. For example, the General Accounting study, cited by Mr. Lesher, correctly pointed out that the plan calls for a substantial voluntary response by the public and state governments, as is appropriate in a national plan. We believe that the necessary voluntary action will be forthcoming and that the plan will meet its goals. Evaluation of the independent analyses leaves us still convinced that the estimates presented by the Administration are valid and represent reasonable projections of what can and will be achieved by the plan.

Even if, as we do not believe to be the case, the plan would fall short of achieving its objectives, it hardly seems that amendments weakening the plan are the appropriate response. Also, the subsidies and plowbacks proposed would, as discussed, merely improve the cash position of producers without attendant public benefits.

SPECIFIC COMMENTS

"Gas Guzzler" tax.—The Chamber of commerce opposes the "gas guzzler" tax on the basis that it would have an adverse effect on automobile sales and automobile industry employment and discriminate against large families that use larger cars. The gas guzzler tax will encourage purchase of more efficient cars, but this does not necessarily translate into damage to Detroit. Large families should find an ample selection of room, but more efficient cars in the new car market. By reduction of weight and excess power, sizeable but fuel-efficient vehicles can be produced to meet this need.

Deduction for State and local taxes.—The Chamber opposes the elimination of the Federal income tax deduction for state and local taxes for the gasoline motor fuels, that appears in the House bill but not in the NEA. The House action not only closes a tax benefit that generally favors the affluent, but also limits a subsidy for automobile travel that is inappropriate.

Excise tax on intercity motor fuel.—The Chamber of Commerce supports the Administration on removing these taxes.

Insulation, wind and solar tax credits for individuals.—The Chamber supports the Administration's provisions on tax credits.

Business energy tax credits.—The Chamber of Commerce believes that "the urgent effort to retrofit existing facilities" merit special tax credits as proposed by the Administration.

Crude oil equalization tax.—As discussed, the Chamber believes that the oil companies should benefit from bringing crude oil prices up to their replacement level, either through allowing them to capture some of the windfalls or economic rents or through a plowback. Analysis leads us to conclude that the additional cash-flow would not stimulate much additional investment beyond that generated by the initiatives in the NEP.

Oil and natural gas user tax.—The Chamber of Commerce proposes a system whereby coal conversion would be encouraged by capital cost assistance rather than through taxation. The issue here is whether the cost of conversion should be imposed upon the public-at-large through tax advantages or be borne, in the first instance, by the industries involved. We believe that equity requires the latter.

Standby gasoline tax.—The Chamber of Commerce opposes the standby gasoline tax proposed by the Administration. The Chamber assumes, unlike the Administration, that a standby tax would be triggered. Moreover, the Chamber implies that it would be relatively ineffective in affecting gasoline consumption. Short-run price elasticities are low, however, long-run elasticities of demand for gasoline appear to be considerably higher.

Treatment of intangible drilling costs.—The Chamber supports the Administration's position.

The chamber's alternative approach.—Basically, the Chamber proposes to deregulate natural gas, lift controls on crude oil, enact new environmental control laws, simplify the regulatory process and increase leasing of oil and gas from the Outer Continental Shelf and energy resources on other federal lands. The Administration is working to achieve more OCS leasing and improvement in the regulatory process. Deregulation of natural gas would cost consumers over $70 billion between now and 1985 with little additional production resulting compared to that resulting from adopting the National Energy Plan. As discussed,

lifting controls on new oil would merely provide windfall profits to petroleum firms. Finally, we constantly seek improvements in environmental laws and regulations, but believe that the environment can and should be maintained while we solve our energy problems.

In sum, we believe that the National Energy Plan achieves the objectives of the Chamber of Commerce's proposal in a manner that is more equitable, environmentally sound, and effective.

TESTIMONY BY CONGRESSMAN JIM MARTIN, OF NORTH CAROLINA, ON PROCESS FUEL USE

Mr. Chairman. Prior to taking action on the Energy bill which passed the House last week, the Ways and Means Committee adopted a provision to exempt industries from the excise tax on oil and gas if they could not convert to coal.

The Committee heard testimony and has given consideration to the problems associated with the exemption of "process fuels" from the imposition of the oil and gas consumption tax. On the one hand, it was the desire and intent of the Committee that the tax not be imposed under circumstances where conversion to another fuel is not technically, environmentally, or economically feasible, or in those instances where conversion would result in adverse effects on the manufacturing process or the quality of the manufactured goods; on the other hand, the Committee recognized that the tax should be imposed in areas where substitution of coal can be accomplished without adverse effects. The Committee intends that certain uses of oil and natural gas such as, for example, use as a fuel in boilers, turbines, or internal combustion engines, should be subject to the tax.

The language in Section 2041 of the bill, relating to exemption from the oil and gas consumption taxes for process fuels, and particularly Section 4993 as it would be added to the Internal Revenue Code, is intended to exempt from the oil and gas consumption taxes process fuel usage which meets the criteria set forth in the statute. Such process uses will not be subject to the tax.

These process uses fall into a number of different categories. These include instances where the substitution of coal would materially and adversely affect the manufacturing process because precise, consistent or evenly distributed temperature control or rate of heating is vital; instances where the substitution of coal would materially and adversely affect the quality of the manufactured goods because clean burning characteristics or other physical properties of oil or natural gas are essential to change the chemical composition of the product or to prevent product contamination; instances where the substitution of coal would materially or adversely affect the overall energy efficiency of existing energy conservation equipment such as furnace regenerators; instances where the use of oil or natural gas is required because of the nature or character of the process equipment such as, for example, where alternate fuels would corrode or damage the process equipment; instances where oil and natural gas is required for plant protection purposes, such as to protect process equipment from damage during shut-downs, process upsets, etc.; instances where the use of a substitute fuel would put the user in violation of applicable environmental standards under the Clean Air Act, the Federal Water Pollution Control Act or similar statutes, or in violation of state or local law or ordinances; and instances where substitution of another fuel would not be technically or economically feasible.

By way of illustration, although not intended as an exhaustive listing, the intent of the Committee is that the tax would not apply in specific industry situations such as the following:

Textile Industry Uses.—With regard to the textile industry the Committee intends for the process fuel exemption from the industrial users tax to apply to those uses in the textile manufacturing process, including carpet and apparel, involving direct flame application or precise temperature control such as, but not limited to, singeing, preparation, dyeing, finishing, printing, heat-setting and curing.

Chemical Industry Uses.—In the chemical industry, process uses generally fall into three categories. In the first category, either the physical properties of the material itself, or of its flame during combustion are essential to the chemical process. Examples are molecular sieve regeneration and direct flame heating of catalytic fume abaters. A second category is where the characteristics of the process equipment are such that substitution of an alternate fuel would harm the process. As examples, metallurgical requirements for various types of reformers, incinerators, heat exchangers, vaporizers, etc. are dictated by the process streams being handled. These metallurgical requirements then in turn dictate the fuel requirements. A final category consists of process heaters where precise temperature control is required in order to control a reaction, for product quality or for other reasons. For example, various reformers, furnaces, etc. with multiple burners are used to make ethylene, ammonia, methanol, etc.

Steel industry uses.—Such process uses include use of gas or oil in open-hearth furnaces where such fuels are used for their chemical content and for flame characteristics and precise temperature control; ladle heating and drying where precise drying cycles and temperature controls are involved; annealing of pipe and tubular goods where precise temperature control is necessary and where gas is necessary from a metallurgical and finishing standpoint; curing of sand cores and molds for the production of iron and steel castings, where precise temperature control is necessary and where impurities in other fuels would be detrimental to the metallurgical and physical properties of the castings; calcining, where natural gas is used to change the chemical composition of the iron ores and where coal cannot be used because its impurities would adversely affect the process of ore benefication; sintering, where gas is used to ignite coke particles to agglomerate iron ores, mill scale, limestone and other waste products into a feed material for a blast furnace; soaking pits, where natural gas is necessary for precise temperature control and to prevent physical and metallurgical damage to the steel ingots during the heating cycle; slab conditioning, where natural gas and oxygen are used in a special torch to remove surface imperfections to assure proper quality control of the product for use in oil casings and other tubular goods; rolling-mill combusters where natural gas is necessary for precise temperature and rate of heating control; blast furnace injection where small amounts of natural gas (approximately 11% of total energy supplied) are injected through tuyeres for immediate and precise temperature control, whereas the injection of coal would add contaminants, reducing productive capacity and resulting in lower quality iron.

Glass container industry uses.—Natural gas and oil used in direct fired applications in the glass melting and refining stages where such fuels are required for their precise temperature control and precise flame characteristics; such characteristics are essential to maintain temperature and composition homogeneity of the molten glass, to preserve the integrity of the refractory lining of the furnace, to prevent fuel induced impurities which would cause product contamination, adversely affecting product quality, and to operate the furnace in an energy efficient manner. Gas is used also in the forming, annealing, and other finishing operations of the glass container manufacturing process because of its unique form value; that is, all of these operations require the precise temperature control, instantaneous heat response, and clean-burning properties that natural gas affords. In the forehearth feeders, forming machines, and annealing lehrs, for example, the glass is blown and formed into the proper container shape and then cooled and annealed to remove internal stresses. These uses are fired directly by gas in order to maintain homogeneous temperatures throughout each glass container, to maintain the overall container temperature within precise tolerances, and to assure production of commercially acceptable glass containers with the required tensile properties and other quality control criteria.

STATEMENT OF DOMENIC J. FALCONE, VICE PRESIDENT, GEOTHERMAL RESOURCES INTERNATIONAL, INC.

Mr. Chairman and Members of the Committee, my name is Domenic J. Falcone, and I am a Vice President of Geothermal Resources International. We are a small publicly-held company which provides equipment lease financing and is also engaged in the production of geothermal energy and coal. We qualify as a "small business" under most definitions of that term. We do not produce or market any oil or gas.

We urge the Committee to report favorably on so much of the pending Energy Tax Act as relates to the treatment of intangible drilling costs in the case of geothermal energy. The House-passed bill permits geothermal companies to deduct intangible drilling costs in the same manner as oil companies may deduct those costs. This is completely in line with the President's energy tax proposals.

We feel, however, that this treatment of intangible costs will go only part of the way toward attaining the President's stated objective, which is to make the tax treatment for geothermal resources equal to that of other natural resource industries.

What is also justified and needed is a treatment of income from geothermal resources which is in line with that accorded to mining generally, including the production of oil and gas by independent producers.

The House-passed bill fails to meet this additional need. It commendably recognizes the fact that geothermal deposits are subject to exhaustion or depletion. However, it provides a depletion allowance of only 10 percent and places a ceiling on the use of the allowance limited to the adjusted cost basis of the property. By contrast, most mining operations, including oil and gas, are allowed a higher depletion rate without the imposition of any ceiling.

The President has set forth a worthy goal. It is to "bring about equality of treatment among activities which compete for capital." We urge the Committee to amend the House-passed bill so as to do just that. This can be accomplished by (1) raising the allowance rate from 10 percent to as high as 22 or 25 percent; and (2) removing the provision that the allowance shall not exceed the adjusted cost basis.

We think the Committee should consider the fact that the House-passed bill reduces, rather than increases, the investment incentive so far as geothermal "steam" is concerned. At the present time, "steam" is accorded 22 percent depletion allowance as well as the privilege of deducting intangible drilling and development costs. Under the House-passed bill, however, the depletion allowance would be reduced to 10 percent subject to the adjusted basis ceiling. The natural effect of the House-passed version would be to attract investment away from geothermal energy, which is the opposite of the President's program.

We are a small independent company getting started in the energy industry. We hope to help in furthering geothermal energy as an integral part of the energy program.

Geothermal resources, of course, will not soon become a major element in solving over-all energy problems. But it is already important in Northern California. Sufficient resources seem to be available and the technology is constantly improving; therefore a substantial contribution to the energy picture in areas such as the inter-mountain West, Alaska, Hawaii, and the Gulf Coast can be expected to be made. Studies made by both private and government sources support this view.

Furthermore, the generation of electricity is not the only end-product that is in sight. Space heating, air conditioning, food processing, sugar refining, and hydroponic farming are among the other purposes that likely will be involved. We are investigating some of these possibilities. They seem attractive partly because they do not require the long lead-time of seven to ten years that is involved in the case of electric generation.

These future non-electric end-uses of the resources have shorter revenue-recognition periods. However, the fact remains, even in their case, that without full and appropriate tax incentives they will not attract investment capital in any large amounts.

The present Tax Code repels rather than attracts investors to involve themselves with geothermal resources. It discourages companies from seeking guaranteed loans or other forms of credit.

I have recently attended meetings of the Geothermal Resources Council, a private industry organization; also meetings of the Legal and Institutional Subcommittee, a unit of ERDA's Advisory Committee on Geothermal Energy. Full and equal tax treatment for geothermal resources was viewed at those meeting as proper to help attract capital into the industry. Several of the smaller exploration and development companies such as ours believe that appropriate tax incentives are vital to their continuation in the business.

The industry is poised for major expansion if the investment climate, considering tax incentives, is right.

The Committee should consider carefully the provisions of S. 655, introduced by Senator McClure and S. 1061 introduced by Senator Gravel. Legislation similar to these bills has been passed by the Senate in each of the two preceding Congresses. The House-passed bill conforms to these bills as well as to the President's recommendations in regard to deductibility of intangible drilling costs. It can be fully conformed to these bills and the two preceding Senate actions by (1) raising the rate of allowance above 10 percent! and (2) removing the adjusted cost basis ceiling on the allowance.

I think that any thoughful analysis of the House-passed adjusted cost ceiling will show that it is without merit. In practice it would work out to little or nothing more than cost depletion, a principle to which other mining industries are not generally subjected or are proposed to be subjected in the President's program or in the House-passed legislation.

Attached is a set of commonly raised questions and answers involving the geothermal industry. I believe that a review of them will be helpful and important in your considerations of the matters I have raised in my testimony.

In conclusion, I want to express my personal appreciation for this opportunity to advise the Committee on this matter. I urge the Committee to adopt the amendments that I have described. If these amendments become the law, along with the recommendations submitted by the President, the Government will have contributed at minimum cost toward accelerating the development of this resource, which for too long has been a misfit in the Tax Code.

QUESTIONS AND ANSWERS ON THE TAX TREATMENT OF GEOTHERMAL ENERGY

1. What is the present status of the industry?

The geothermal resource industry is in its infancy state. In this country there is only one geothermal field from which electricity is being produced. This field is called The Geysers and it is located in Northern California, approximately ninety miles from San Francisco. The amount of electricity produced from The Geysers is 502,000 KW, or enough electricity to supply 60% of the needs of a city the size of San Francisco. The total potential productivity of the field is 2,000,000 KW, all of which should be available by 1985 to 1990.

Other areas of the western states as well as geopressured areas in Louisiana and Texas show some promise for the future. Specifically, in Klamath Falls, Oregon, Boise, Idaho, Calistoga, California and Steamboat Springs, Nevada geothermal resources found at shallow depths are being used for space heating and cooling as well as greenhouse and other farming type operations.

In areas such as The Imperial Valley, California, Roosevelt Hot Springs, Utah, Valles Caldera, New Mexico and others, exploration activity is progressing in hopes of establishing sufficient resource to generate electricity as in The Geysers.

In Geological Survey Circular 726 prepared in cooperation with ERDA, it was concluded that: "Resources of the most attractive indentified convection systems (excluding national parks) with predicted reservoir temperatures above 150 degrees C (or 300 degrees F) have about 8,000 megawatts · cent, or about 26,000 MW for 30 years."

As the temperatures reduce, although the heat is not as great as above, the resource is still available. See the attached conclusions pages of the circular.

Whether these activities and projections continue and are met and at what rate depends on a large part to what type of tax treatment is available to a company interested in investing in a very risky business.

2. What is the present tax treatment?

As to intangible drilling and development costs (all costs of drilling and development that are not salvageable), they can be deducted from current income if the resource is adjudged to be a "gas" (as in "oil and gas wells"). However this interpretation has been applied only in the case of "steam" at The Geysers. The IRS has indicated unwillingness to allow the deduction in the case of "hot water" or other kinds of energy. So, except for "steam", and currently this is only applicable to steam at The Geysers, the costs would have to be capitalized and written off against future production.

As to "depletion", and amount of 22 pct. of gross production may be deducted if the resource is adjudged to be a "gas". This interpretation likewise is confined to "steam" at The Geysers. "Hot water", steam anywhere other than in The Geysers and other kinds of geothermal energy are afforded no deduction for exhaustion or as a reward for a new discovery.

3. What is the Administration's recommendation?

The "National Energy Plan" states a purpose "to bring about equality of treatment among activities that compete for capital". However the Plan falls short of this purpose by providing only for rectification of unequal treatment in the case of intangible drilling and development costs. (The i.d.c.'s would be deductible for all forms of geothermal resources in the same manner as in the case of oil and gas). The Plan fails to bring about equality of treatment.

Under the Plan, the present unequal treatment would be continued in the case of the "depletion" allowance, except for "steam" at The Geysers. New investment capital would continue to be attracted away from "hot water" and other non-"steam" forms and into oil, natural gas, coal, uranium, and oil shale.

4. Do geothermal resources deplete?

There is scientific evidence that geothermal energy is an exhaustible or wasting resource. Such evidence is available, for instance, from experience to date at The Geysers.

Specifically the following chart should be of use:

Year	Wells drilled to replace depleted wells	Installed generating capacity (kilowatts)
1972	1	192,000
1973	1	302,000
1974	2	412,000
1975	7	467,000
1976	6	502,000
1977	6	502,000

In the earlier years, there were more wells than plants, therefore replacement wells were not necessary.

In the case of *Reich* v. *Commissioner*, 454 F.2d 1157 (9th Cir., 1972), the Court upheld a finding of the Tax Court (52 T.C. 700, 1969) that the geothermal deposits at The Geysers are exhaustible and were, in fact, depleting, based on pressure measurements made over a period of 42 years.

The argument against depletion is advocated by those who do not understand the resource. First of all, no one is sure whether the heat of the earth is actually diminishing. However, the heat by itself is presently useless. It needs something to carry it to the surface for use, namely water. The water is diminishing and therefore the resource is also diminishing because it is becoming useless or not available as its conductor exhausts. To date, reinjection into the system is not helping replenish the availability of the resource.

5. What would happen if equality of treatment were fully given as between geothermal energy and oil and gas?

The consensus in the industry is that the companies, both large and small, would come in, using the existing and developing technology. Progress could then be made toward attaining the Government's tentative goal for geothermal energy. At least enough progress could be made to delineate geothermal resources to support 20,000 megawatts of electrical generating capacity by 1985. This production would be equivalent to 250,000,000 barrels per year of low sulphur crude oil. Translated into current imported oil prices, the savings on the balance of payments outflow would be $2,750,000,000.

6. What would happen if equality of treatment is limited to intangible drilling and development costs?

The industry consensus is that new exploration would be delayed. The Government's goals would not be reached; and neither would industry's estimates. Government leases would likely remain undrilled and undeveloped. The independents and small-business concerns would be especially hard-hit. More foreign oil would have to be imported. The price charged for the resource would be increased and the consumer would have to pay it.

7. What is the current price of geothermal energy?

The current price being paid for geothermal energy is 14.18 mills per k.w.h., which is equivalent to about $5.5 to $6.50 for a barrel of oil.

These figures may be misleading, however, because the "steam" at The Geysers is a uniquely bountiful resource, not likely to be duplicated in the United States. A recently completed survey which seems to have some reasonable amount of support in the industry indicates at least in part the following as far as price paid for steam versus other forms of electricity generation:

Energy source	Price of electricity at busbar (mills/KHW)	
	Present	Future
Nuclear powerplant	19-20	29
Conventional oil fuel		
Powerplant (low sulfur)	28-30	34
Combined cycle power		
Plant (low sulfur oil)	26-38	32
Coal-fired powerplant	20-23	29
Steam	17	20

Further, although it is not possible to say nor predict with any degree of assuredness, it has been estimated that the cost of a hot water binary system power plant could range in price at the busbar from 16 to 47 mills per KWH.

8. For how long does the infant geothermal industry need a Government subsidy?

There is a consensus in the industry that a tax deduction, similar to "depletion", should continue at least 10 years from date of first commercial production. The period of 10 years could not feasibly be dated from the present time, or from the date of well discovery, because of the fact that a very long period of time, say 5 to 7 years, is required after discovery, in order to drill development wells, negotiate a sale to the public utility, and await completion of the generating plant and facilities.

The consensus is that the deduction in the case of intangible drilling and development costs should continue indefinitely.

9. What legislation could be substituted for the Administration's proposed treatment of geothermal energy in H.R. 6831?

Several bills are available for this purpose.

H.R. 277 (Goldwater) would give geothermal energy parity with oil and gas as to intangible drilling and development costs, and also provide a 25-percent exhaustion allowance; no time limit.

H.R. 6147 (McFall) would give geothermal energy parity with oil and gas as to intangible drilling and development costs, and also provide a 25-percent exhaustion allowance, which, however, would be limited to persons other than major oil companies; and all provisions would expire at the end of 10 years.

H.R. 7138 (Jones-Ketchum) would give geothermal energy parity with oil and gas as to intangible drilling and development costs, and also provide a 22-percent exhaustion allowance without time limit. "Geothermal energy" is defined to include natural methane gas which is contained in or produced in association with geothermal steam and associated geothermal resources.

(Methane gas is expected to be recovered in paying quantities from wells to be drilled in the geopressured zone along the Gulf Coast. Information about the geopressured resources is contained in Senator Helms' Floor statement, Congressional Record, May 27, 1977, at pages S 8836–8839).

These bills represent current legislation in front of Congress. Consideration could be given to any one or a combination of the following:

1. Domestic Energy Incentive Credit of 25% of total cost of successfully completed wells to be either treated as a subsidy, tax liability reduction or interest free loan repayable out of future geothermal revenues.

2. Balance of Payments Credit of a stipulated percentage which would be applied as a reduction of revenues received from sale of steam. It would serve to acknowledge the positive effect on the balance of payments for not having to import oil. It would only be applicable as long as the price of steam was less than the price of imported oil.

3. A tax holiday of say five years after revenues begin.

10. Why should tax incentives be provided for a geothermal energy at a time when there are proposals to eliminate the existing tax incentives provided in the case of oil, gas, and other energy sources?

Our energy situation is critical. Inaction on the part of Congress to enact appropriate tax legislation for this new, vital industry at this time could seriously impair the competitive position of companies engaged in the search for energy sources.

Long established tax provisions promote the development of energy supplies. The tax policy of the United States toward energy companies could determine the outcome of the energy crises.

Further the Administration has correctly stated that, so long as geothermal energy is disadvantaged in the Tax Code, exploration and development of geothermal energy will not come up to desired levels. Unfortunately the Administration's specific legislative proposal at this time goes only part of the way toward meeting the goal of quality in tax treatment.

So long as the present disincentive, in the case of geothermal energy, exists, new capital will continue to be attracted to oil, gas, uranium, and coal, and to be withheld from geothermal energy.

A proper solution is to enact legislation now to bring geothermal energy into at least a party with oil and gas. It is very important to remember that geothermal resources is not oil, gas, uranium or coal not only as to what it is, but also, as to its maturity as an energy resource. These other resources all had favorable tax considerations in their developing state and it is difficult to see why geothermal should not be so treated.

11. Although the price of steam is presently 14 mills per k.w.h. compared to 22 mills per k.w.h. for conventional oil fuel, does the consumer in the steam production area receive the benefit of a lower price paid for electricity than if the electricity was being generated entirely by burning oil?

Before answering the question directly it is important to remember that:

1. Pacific Gas and Electric Company which used the only steam production in the U.S. is regulated by the California Public Utility Commission, which has one of the finest reputations for protecting its consumers in the entire country.

2. Rate charges and fuel costs are reviewed by the Commission on a quarterly basis and adjusted accordingly.

3. Fuel costs are expenses that are recoverable on a dollar for dollar basis with no profit element attached.

It becomes obvious after bearing these comments in mind that since fuel costs are recoverable from the consumer only to the extent of their absolute costs that as long as geothermal is less expensive than other forms of energy sources then the consumer is receiving the benefit of not having to pay for those more expensive sources.

An example of the saving involved from the current Geysers production of 502 MW is illustrated as follows:

502 megawatts generated from steam cost the consumer	$62,356,000
502 megawatts generated from oil cost the consumer	69,025,000
Savings passed on to consumer from geothermal	6,669,000

SUPPLEMENTARY TESTIMONY OF DOMENIC J. FALCONE, VICE PRESIDENT, GEOTHERMAL RESOURCES INTERNATIONAL, INC.

Mr. Chairman and Members of the Committee, I have previously submitted testimony on the proposed Energy Tax Act of 1977 concerning that part of the Act dealing with intangible drilling costs deductions and depletion allowances for the operator of a geothermal steam exploration and development company. In my previous testimony I supported certain concepts in H.R. 6831 and advocated different treatment for others, like the depletion allowance. I have supported both Senator McClure's and Senator Gravel's legislation, S. 655 and S. 1961.

Some of the problems in the geothermal industry have developed because of the tax inequities already existing in the tax laws. Additional problems are caused by the lack of incentives for the ultimate user of the geothermal resource, be it for electric or non-electric use. There exists in the current proposed Act a method which, if expanded to cover a wider range of equipment, could help mitigate this problem. I am referring to Section 4998 in which Section 4996 Property is defined and Section 2061 in which an Energy Percentage credit of an additional 10 percent is applied to Section 4996 Property. I believe that most people in the geothermal industry as well as researchers who have studied the potential of geothermal resources agree that the resource will be more widely utilized for non-electric purposes.

The language of Section 4998 limits the credit to self-used energy and not to all facilities for both electricity and non-electric uses. This type of limitation will do nothing for accelerating the efforts of the companies involved in attempting to solve some of the nation's energy concerns by bringing on-line this alternate energy source as early as possible.

I believe that this Committee should recommend that this additional credit be applied to all facilities to be used in both electric and non-electric end uses of geothermal energy under all conditions. This suggested approach has the endorsement of all of the industry members with whom I have had contact, as well as a number of industry committees and councils.

I wish to once again thank the committee for allowing me this opportunity to submit testimony on this very important Energy Tax Bill of 1977.

STATEMENT OF CHARLES L. BINSTED, EXECUTIVE DIRECTOR, NATIONAL CONGRESS OF PETROLEUM RETAILERS

The National Congress of Petroleum Retailers represents approximately 60,000 branded service station dealers from across the nation. We appreciate the opportunity to submit testimony to this Committee which expresses the views and concerns of our membership on the tax provisions of the President's Energy Proposal.

Our membership would like to take a positive position in the conservation of energy. We understand that we must share a part of the burden to achieve a reduction in energy use. In fact, the retail sector of the petroleum industry has already suffered substantially as a result of the energy problems of the last four years. Over 40,000 service stations have been casualties of the changing conditions. Many more will be forced from the market. Service Station dealers face a no growth or negative growth gasoline market for years to come if the goals of the President's program are achieved. We will have to adjust to this reality but we hope you will not pass legislation which will increase those burdens unnecessarily.

In our opinion the punitive gasoline tax proposed by the Administration with the object of reducing gasoline consumption, must be opposed for several reasons. First and most important, it will not accomplish its objective but instead will place an unnecessary burden on both the public and the service station dealer. Some have already referred to the proposed gasoline tax as the "poor tax" since it falls most heavily on those who can least afford it, while the more affluent simply buy their way out of the problem with little relative impact on either their purse or life styles. This hardly squares with the President's stated desire that the solution to our energy problems must be fair with equal sacrifices shared by all classes.

I cannot believe that anyone in government really believes that such a tax can be equitably redistributed or that any significant portion of it will ever find its way back to the public. This is best demonstrated by the many groups and individuals who are already calling for exemptions for one reason or another. If such exemptions are granted it will greatly reduce the amount of money available for redistribution to the general public. If exemptions are not granted serious hardships could fall on certain groups.

The evidence already in supports our belief that a gradually imposed tax will have little or no effect on gasoline consumption since demand is rather inelastic. Substantial increases in gasoline prices in the past three years has not resulted in reduced consumption but rather we have seen increased consumption. Data available from the U.S. Department of Commerce Bureau of Mines reveals an increased demand for gasoline in such countries as Germany, France, and Japan while prices were escalating rapidly and the product was selling for considerably more than $1.00 per gallon.

The House of Representatives has proposed a four or five cent retail tax on gasoline, the proceeds of which are slated for mass transit, strategic reserves, compensation to the state for lost revenue due to reduced consumption as well as highway building and maintenance. It is unsure as this is written what course the House will follow or even if it will pass a gasoline tax in any form.

It does seem to us that the public has been misled if such a tax is imposed. They were first told that any gasoline tax would be returned to them so as not to disadvantage the poor and middle income groups. So now we tax them at the wellhead, give them a piece of that back and then take it and more away with a retail gasoline tax.

The House leadership has admitted that such a tax would have a negligible effect on consumption. That being the case it is then obvious that to pass such a tax is to use the energy shortage as an excuse for raising revenues.

Congressional action, past and pending as well as inflation and the increased costs of finding and producing energy makes it inevitable that we will see substantial increases in the price of gasoline without additional taxes. This in itself will have a great impact on retail service station dealers. It wil require them to generate more capitol to pay for product storage since all gasoline is delivered on a cash basis. But since much is sold on credit cards, all dealers will have higher outstanding receivables. Losses of product from shrinkage and evaporation will also increase as the price of the product increases. It is also true that as the wholesale price increases competition becomes more intense at the retail level and the history of this industry clearly indicates that virtually all price competition is found at the retail level.

We understand that we must somehow cope with the problems imposed by the increase in wholesale price, but we do not believe this Congress should exacerbate those problems—and add others—by the imposition of a punitive tax on gasoline.

Just as increased prices put demands on retailers for additional capitol so will increased taxes because the retail dealer must pay the tax in advance. It has already been established that he can never recover all of these taxes from the public because of shrinkage, evaporation and other losses attendent to handling a bulk liquid product. Many states have recognized this fact and have provided for partial refunds of state taxes to compensate for such losses. The Federal Government must be prepared to provide refunds on Federal taxes of up to 2 percent if the Congress insists on imposing additional Federal gasoline taxes.

Another highly important point to consider is the tax on tax now paid by service station dealers. I refer to the states or jurisdictions which now impose a gross receipts tax on businesses which is applied to the total selling price of all products—tax included. The dealers then must pay a gross receipts tax computed on that basis. Also some jurisdictions impose a sales tax on gasoline which is also computed on the total price of the product including taxes. Another example that lies ahead is the percentage tax now being considered by many states and jurisdictions where the state or local tax will be computed as a percentage of the total retail price of the gasoline including federal tax rather than in cents per gallon which has been common practice. It is evident that such actions will ripple the cost of the product upward as the federal tax increases.

Also of concern to service station dealers is the wisdom of imposing a wellhead tax on "old" domestic crude to bring its price up to or perhaps above the price of imported crude. In fact, the wellhead tax could have the effect of encouraging the importation of refined products. We know that it is less expensive to refine in foreign countries and we could soon see less expensive finished product imported into the United States with corresponding outflow of additional dollars.

If less expensive gasoline is imported as a result of high domestic crude oil taxes, branded retail dealers will suffer economically since in general they will not have access to such product and will continue to pay the dictated wholesale price (D.T.W.) of their branded suppliers.

If the wellhead tax is passed our membership is opposed to any amendment designed to give preferential treatment to any group of refiners under the proposed wellhead tax on crude oil.

Small refiners now enjoy a "small refiner bias" and individual smaller refiner exemptions through provisions of the Emergency Petroleum Allocation Act and FEA regulations.

The bias was designed to protect small refiners (175MB/D or less) who suffer inefficiencies of scale. It has in fact become a windfall subsidy that operates to the disadvantage of all branded dealers as well as many private brand operators who purchase from refiners whose capacity exceeds 175MB/D. The refiners who receive this benefit realize an average advantage of about 2 cents per gallon. In theory this is meant to keep them whole. In practice it gives them a tremendous advantage in a highly competitive market. A competitive advantage that is at the expense of another independent segment of the market; that is all retailers who are buying from larger refiners.

There is absolutely no excuse to subsidize inefficiencies for one group of independents and fail to subsidize inefficiencies for all.

If the price of crude is equalized through taxation there will be no justification for giving relief to small refiners just to insure that they remain in business, as long as they can obtain feed stock at competitive prices.

The present program has encouraged new entrants into refining for the sole purpose of obtaining the subsidy now available. The longer such a system continues, the longer we will have refiners totally dependent on it.

Assuming that the wellhead tax is adopted it would seem to make sense that a portion of such revenue be used for stockpiling strategic reserves and the development of alternate energy sources. Since it is now obvious that no matter what this Congress does we will still be heavily dependent on foreign oil by 1985. It is also obvious that strategic reserves and alternate forms of energy provide the best solution to what is nearly an insoluble problem.

In your consideration of the President's Energy Proposals we ask you to keep in mind the serious adverse impact that some of these proposals could have on our members, the small independent service station operators.

STATEMENT OF ARTHUR C. KREUTZER, EXECUTIVE VICE PRESIDENT AND GENERAL COUNSEL, NATIONAL LP-GAS ASSOCIATION

SUMMARY

This statement is presented by Arthur C. Kreutzer, Executive Vice President and General Counsel of the National LP-Gas Association and is directed to tax aspects related to the National Energy Act and the National Energy Policy, in primarily promoting energy conservation. It is our recommendation:

I. That S. 1472 be amended to remove taxation of natural gas liquids, and in particular of propane, under the crude oil equalization tax, or in any consideration of taxation of natural gas liquids per se, in that such taxation will not productively serve the objective of conservation, and will create an unnecessary complex and costly tax administrative burden on government, the propane supplier and retailer, and the consumer.

II. That to remove an existing tax disincentive to energy conservation Sec. 4041 of the Internal Revenue Code be amended to limit the motor fuel tax on liquefied petroleum gas to use in a highway motor vehicle, thus removing this tax on off-highway use in industrial plant lift trucks and tractors.

III. That S. 1472 be amended to provide a curb on federal lending that is used for unnecessary extension of natural gas service, contrary to the national energy policy.

INTERESTED PARTY AND PRODUCT

The National LP-Gas Association is a national trade association, having as members the producers of liquefied petroleum gas, the manufacturers of equipment and appliances using liquefied petroleum gas, and the distributors and dealers. LP-gas is the common name used for our product. The Association has over 5,400 member companies and 43 affiliated states. The membership represents over 90 percent of the industry's volume of business. Its membership is predominately at the distributor and dealer level. The Association's position as set out in this statement would also reflect the position of other industry companies.

The economic impacts of the matters discussed herein are more directly felt by the distributors and dealers who sell LP-gas at retail. The employment and well-being of over 75,000 employees is involved in the LP-gas dealer's business and the problem presented. The manufacturers of, and dealers in equipment utilizing LP-gas are also adversely affected. Again, to the degree indicated in this statement, this problem is of serious concern to thousands of users of LP-gas equipment.

Liquefied petroleum gas (LP-gas) is composed of propane, butane, propylene, butylene, and their mixtures. Propane is the principal LP-gas product involved. It is an energy source, or fuel, that has multiple uses, primarily on the farm, and in small town or rural areas. It serves over 13 million installations in the U.S. Of this number approximately 10 million are residential or agricutural. In its uses it is valuable where a mobile energy source is needed. In this respect, a part[1] of total product usage is in motor fuel, principally off the highways. A portion of such motor fuel use is in industrial lift truck and tractors. The tax handling of this use is one subject of this statement.

I.

For an understandng of the taxation impact of S. 1472 on natural gas liquids, and in particular propane, we point out that natural gas liquids are obtained both from refinery sources and at natural gas processing plants. While S. 1472, in its introductory form, only presents a crude oil equalization tax, comparable taxation on natural gas liquids is being proposed by the Administration and is under consideration in the House of Representatives. Because of this and the common problems involved, this statement is directed to, and has common application for, both tax approaches.

A. Natural gas liquids are the by-product of the production of natural gas and the refining of crude oil. Approximately 65 percent of all natural gas liquids are removed from natural gas at natural gas processing plants. The remaining 35 percent of natural gas liquids are produced as a result of refining crude oil. Relating this situation to taxation of natural gas liquids a possible inequity

[1] Total internal combustion use in 1974, the latest year available was 1,162,396,000 gallons or .076 percent of total product use (U.S. Bureau of Mines Report). The major portion of this use is on the farm, for tractors, irrigation pumping, etc.

may arise under the existing provisions of S. 1472 whereby to the Crude Oil Equalization Tax, applied at the point of first sale, would be added an additional tax on natural gas liquids resulting from the refining of this crude oil creating double taxation. This warrants correction.

B. To deal more specifically with propane, approximately 80 percent propane is derived from natural gas extraction and 30 percent from refinery production.

While the National Energy Plan may not present a disincentive to domestic propane production, it does not supply the needed incentive, for vitally needed added domestic supply, in the fact of declining production. Propane production peaked in 1972 at 601 MB/D and has declined since that time to 521 MB/D in 1976, a decline rate of 3.5 percent. This decline is forecast to continue at a 4 percent decline rate. Refinery production has increased slightly and this increase is expected to continue. However, a net annual decline in availability of domestic propane of 2½ to 3 percent is forecast. U.S. Bureau of Mines data demonstrates this supply shrinkage. FEA studies contain similar data. The restrictions in the definitions of "new oil" and "new gas" detract from development.

The purported incentives for natural gas that are directed at placing intrastate natural gas into the interstate gas stream will do little to increase propane supply, except to the limited degree that "new gas" above and beyond the existing rate will be produced. Propane is now being extracted from intrastate natural gas and no bonus increase appears probable. "New gas" incentives already exist to a degree in propane gas plant price and may appear in an FEA regulatory revision now in preparation. If the Energy Plan results in a disincentive to natural gas production, as has been presented by others who are more expert in that area, it will contain a comparable disincentive to propane gas plant extraction. There appears to be no incentive for natural gas in that existing prices approach the level contemplated in Administration proposals.

Conservation while praiseworthy does not produce new product. Conservation has been practiced in propane usage since 1973 stimulated by increased cost. This has been demonstrated in declining sales since 1973 as shown in U.S. Bureau of Mines statistics, wherein sales of propane declined as follows:

	Thousands of gallons
1972	13,847,948
1973	13,494,198
1974	13,158,599
1975	12,371,980

These figures include a small growth factor. After excluding that factor, it is estimated that conservation measures reduced demand by over 10 percent since 1973, and possibly have bottomed out. We do not believe that the tax proposals will further stimulate conservation.

C. While a rebate, or tax credit of some type is under consideration, this mechanism, or type of approach, in solution of the unfairness of an unproductive tax only creates unnecessary administrative cost and adds to bureaucracy.

Propane has major usage in residential and agricultural installations. These consumers are largely at lower income levels, in rural areas, and in many residential use instances, people in retirement. Propane cost has already induced conservation as earlier shown. Added taxation will only serve to penalize these consumers.

Although we direct Committee attention to what we understand is a probable inadvertent omission in the bill that creates possible discriminatory and inequitable handling of refund or rebate of the crude oil equalization tax, we do not consider this the solution. Sec. 6431(a)(1) provides for refund of the crude oil equalization tax element on domestically refined distillate fuel oil sold and delivered into the tank of a residential structure for use in such structure; 30 percent of the domestic produced propane is derived from crude oil. Propane is sold and delivered for residential use. It is equitable an proper to provide these residential users with the same treatment accorded residential users of heating oils. This could be accomplished by adding, following the term "distillate fuel oil" as and wherever it appears in Sec. 6431 of S. 1472 the words "or propane".

While this recommendation will resolve the threatened inequity and discrimination, we do not consider the procedures prescribed in Sec. 6431 to be practical. The burden imposed on the vendor is unrealistic, costly, and essentially impossible of performance when the millions of transactions involved, and the small business nature and corresponding abilities of the propane vendor are considered.

Rather than rebate, we urge adoption of other recommendations contained herein, that will eliminate need for this procedure.

Use of the tax revenues airising from this taxation for benefit programs, tax credits or some similar return of revenues to citizens at large have also been proposed. We consider it manifestly unfair to impose unnecessary taxation on a segment of the population whose inability to stand added fuel-cost is apparent, and then distribute these monies to other than this taxpayer. However, we repeat that the tax is unjustified in the first instance.

D. S. 1472 as proposed, also presents the probability of duplicate taxation through the Crude Oil Equalization Tax, including taxation of natural gas liquids and the Oil and Gas Consumption Taxes of Chapter 45. While this tax, with its rebate provisions, is directed at promoting conversions to energy sources other than natural gas and petroleum products, including natural gas liquids, taxation has earlier been imposed on petroleum products under other sections of the bill. Natural gas is not subjected to taxation other than in Chapter 45. This tax handling results in duplication of taxation on petroleum products, and discrimination in the preferential treatment accorded natural gas in serving the same markets.

E. The tax provisions of S. 1472 in attempting to approach a very complex mechanism of distribution of natural gas liquids, and particularly of propane, with an equally complex propane market would require a complex system of taxation that is not justified by objectives that are of doubtful value. The administration of this tax would be extremely costly. The complexity of natural gas liquids production and propane source has been briefly outlined herein. A tax at point of first sale could create a tax imposition site anywhere from the hundreds of natural gas processing plants, down to the ultimate retailer vendor, numbered in thousands. In some instances a firm may be the first purchaser as well as the first seller for portions of product. A brief look at the point of ultimate sale, and use, in the energy and fuel marketing of propane will further amplify this complex market. Propane is marketed by some 6,000 retailers, having bulk plant facilities whose primary occupation is propane sale for residential and agricultural use, with a small fraction, less than 10%, going into commercial and industrial use. However, in addition to these propane dealers, there are thousands of other retailers, such as hardware stores, paint stores, department stores, trailer parks, who sell a small amount of propane in small quantities for a variety of uses. Conservation in this later distribution and use would be meaningless. The tax is unnecessary and unfair. Administration would be nonproductive, except in the creation of governmental cost and bureaucracy.

F. With these factors in mind and in solution we recommend:

(1) That natural gas liquids be excluded from the Crude Oil Equalization Tax, and not considered for comparable taxation. This is a recommendation of the LP-Gas Advisory Committee of the Federal Energy Administration, conveyed to the FEA in the Advisory Committee meeting of June 28, 1977.

(2) If this above modification is not considered appropriate, that propane be fully excluded from imposition of the aforesaid taxes, at both the refinery and natural gas plant level.

(3) Or at a minimum, that the aforesaid taxes be not imposed on propane used for residential or agricultural purposes.

II.

The existing discriminatory tax treatment accorded LP-gas, as compared with taxation of competing fuels in their use for the same purposes, is a disincentive to energy conservation, and is contrary to this and other national goals. In solution of these problems we recommend that the motor fuel tax on LP-gas be limited to use in a highway vehicle. This recommendation is equally aimed at eliminating inequity in taxation and limiting the tax to those who receive the benefit.

In industrial truck usage LP-gas is a necessity in material handling and industrial processing, and its taxation becomes a business cost. To follow one step further, the tax burden on competitive products or business is not the same. It varies according to the means employed. Again, because of the diverse end

products this specific tax impact cannot be evaluated, but it is of consequence.

The federal excise tax involved is the basic 2 cents a gallon tax on special motor fuel. (Sec. 4041) The additional gallonage taxes on highway vehicle use dedicated to the Highway Trust Fund are not involved. LP-gas is one of the special motor fuels subject to Sec. 4041. The others are benzol, benzene, naphtha, casinghead and natural gasoline, "or any other liquid". The other liquids that may be involved are unknown to us. The products, other than propane, have little, if any, motor fuel use. The special motor fuel tax does not include in its coverage gasoline, or Sec. 4081 tax products, kerosene, gas oil and fuel oil. Diesel fuel is separately handled as will be later covered. The Special Motor Fuel tax is now imposed on all use in a motor vehicle without restriction to highway use. The tax applies to both non-highway and highway use. Consequently, this tax applies on LP-gas use in an LP-gas powered industrial truck and this is our area of concern. Under Treasury Department interpretations in existence from the early 1940's until 1977 such a motor vehicle was defined as a vehicle designed to carry or support a load. In early 1977, the Treasury Department issued revised interpretations, and without any prior notification of the change in the Federal Register notice of proposed changes, removed the qualifications "designed to carry or support a load" and this expanded the tax from its prior limited coverage of the industrial lift truck, to all industrial trucks.

This action was obviously taken in seeking to correct prior confusion in tax handling that this Association had highlighted in several presentations to Congress, including hearings on the 1976 Tax Reform Act. However, in so doing the prior inequity has been compounded.

A. There is justification for revision in special motor fuel taxation of LP-gas, in that: The existing special motor fuel tax provisions as they relate to energy use in industrial trucks are a disincentive to energy conservation. Propane in industrial truck use is subject to a 2¢ per gallon tax. Use of the electric industrial truck does not face taxation. This discriminatory taxation is a stimulus to inefficient use of natural resources, due to the loss of basic energy in the generation of electricity vis a vis the direct use of the basic energy of propane.

As succinctly stated on May 19, 1977 by Robert W. Fri, ERDA Acting Administrator in testimony before the Subcommittees on Energy and Power of the House Committee on Interstate and Foreign Commerce:

"When a single unit of energy is consumed, for example as electricity in a stove, a light, or a motor, three units of energy must be burned in an electric generating plant. Thus, for every Btu of electricity saved at the using end, three Btu's of primary fuel are saved back at the power plant. It is thus apparent that the conservation of electricity can be an impressive multiplier for the conservation of primary fuels. Now it turns out that two such fuels, oil and natural gas, produce some 35 percent of the electricity in this country. Since a major objective of the National Energy Plan is to reduce their consumption, savings at the power plant become particularly important."

In an earlier governmental report[2] it was estimated that the efficiencies in producing and delivering electricity range from 10 to 25 percent. In other words there is a los of energy resource employed in the production and distribution of electricity of from 75 to 90 percent. The mentioned report further states that systems for providing fuels directly to the consumer are more efficient. "The greatest potential for energy conservation is often in the selection of the right energy system for a particular need".[2] The direct use of propane in an industrial truck is both a more efficient use of a natural resource, and the selection of the right energy system for a particular need. We submit that instead of penalizing use of propane through inequitable taxation, more efficient use should be encouraged. Or to express it otherwise inefficient and wasteful use of energy resource should not be stimulated. These twin objectives can be met by removing the federal excise tax on use of propane in an industrial truck. The stimulus that has been given to use of an electric industrial truck is demonstrated in the following statistical data compiled by the Association from its studies and analysis of the U.S. Department of Commerce statistics.

[2] Energy–Environment and the Electric Power Prepared by the Council on Environmental Quality, August, 1973.

Industrial trucks in use:	1966 Number	1966 Percent of total	1971 Number	1971 Percent of total	1976 Number	1976 Percent of total
Total	623,200		774,000		984,000	
Electric walkers	79,600	12.8	111,100	14.4	162,300	16.5
Electric riders	76,200	12.2	121,100	15.6	182,100	18.5
LP-gas riders	289,800	46.5	335,900	43.4	396,600	40.3
Gasoline and diesel riders	177,600	28.5	205,900	26.6	243,000	24.7

Shipments:	1965 Number	1965 Percent of total	1970 Number	1970 Percent of total	1975[1] Number	1975[1] Percent of total
Total	59,900		69,800		66,400	
Electric walkers	8,200	13.7	13,800	19.8	14,400	21.7
Electric riders	10,000	16.7	14,800	21.2	19,000	28.6
LP-gas riders	25,900	43.2	25,500	36.5	20,500	30.9
Gasoline and diesel[2]	15,800	26.4	15,700	22.5	12,500	18.8

[1] Latest date available
[2] Revised to reflect held conversions.

It will be seen that the market share or use, in the ten year period of Electric Walkers increased by 3.7 percent, the Electric Riders by 6.3 percent while use of LP-gas industrial trucks dropped 6.2 percent. While Gasoline and Diesel Riders use also decreased by 3.8 percent the loss is believed to be primarily in gasoline units that were converted to propane. Contrasting 1965 and 1975 shipments reveal a much greater takeover by electric vehicles where riders, the principal competitive unit, showed a 11.9 percent gain, and LP-gas units dropped 12.3 percent. Not only did LP-gas usage percent drop, but there was an actual decrease of 5400 units.

B. The present special motor fuel tax is inequitable and creates discrimination. An inequitable method of taxation was developed without probable realization of the ultimate discrimination. At the time the Special Motor Fuel tax provisions of Sec. 4041 were developed, the LP-gas fueled industrial truck did not exist. It is probable that there were few in-plant industrial trucks. Consequently, the method of tax handling was created without this usage in consideration. However, the development of industrial truck use now results in discriminatory taxation that deserves correction. The discrimination exists in the 2¢ a gallon special motor fuel tax on use of LP-gas in an industrial truck.

Competing electric battery powered or diesel fueled industrial trucks do not face similar fuel or power sources taxation. There is intense competition in this industrial truck market and the LP-gas powered vehicle, and LP-gas use, is handicapped through this unequal and discriminatory tax treatment that unfairly aids competition. Fuel cost is a substantial element in an industrial plant's decision on the type of truck purchase and the 2¢ a gallon tax as reflected in total operating cost is many times the deciding factor.

Diesel fuel has a basic 2¢ a gallon federal excise tax but only on use in a highway vehicle. The tax is not imposed on use in an industrial plant non-highway motor vehicle. A tax element of fuel cost is not faced when a diesel fueled industrial truck is purchased, or diesel fuel is used.

The electric or battery powered industrial truck does not face this tax, or any comparable tax, as an element of operating cost. Lower operating costs as a result of the tax favored position are a strong competitive sales argument used by electric industrial truck suppliers in their advertising and promotional material. Competitive promotion of the electric industrial truck emphasizes this tax advantage. Removal of the handicapping tax on LP-gas will not completely eliminate this cost differential, but it will place LP-gas on a more equitable and competitive plane. The adverse effect of this promotion is demonstrated in the earlier presented statistical data of this statement.

To carry this element of discriminatory treatment between competing methods one step further, as a material handler industrial trucks serve as conveyors of materials. There is no comparable tax on the power that supplies conveyors of the many other types, such as a built-in belt conveying system. There are also

material handlers or conveyors in electric powered pallets. The inequitable effect of this basic 2-cent-a-gallon federal excise tax on LP-gas use as a special motor fuel is to create a discriminatory tax that fosters tax free competition. It is also a disincentive to conservation.

C. Use of a fuel providing a cleaner environment and working atmosphere should not be penalized. Propane is a clean burning gas, as contrasted with fuel used in other internal combustion engines. A multitude of tests support this statement and documentation can be provided, if desired.

Many industrial plants bought LP-gas fuel or converted existing industrial trucks using other fuels to use of propane with the objective of providing a more desirable, or less polluted atmosphere through use of clean burning propane instead of fuels that place the worker in an atmosphere created by fuels with undesirable emissions. This upgrading of working environment should be encouraged by removal of any tax disincentive. National tax policy should encourage use of clean fuel. Some states with the objective of encouraging use of clean fuel have completely eliminated, or reduced, their highway motor fuel tax on propane. In this statement we are only requesting removal of the inequitable federal tax penalty.

D. The tax dollars involved on special motor fuels under Sec. 4041 are not consequential. While as earlier mentioned, this tax applies to specified other liquids, their taxable use is de minimis insofar as we can ascertain. This tax, in addition to being on use in motor vehicles, applies to use in motorboats and airplanes. LP-gas is not so used, and we understand that use of other special motor fuels, if any, is insignificant.

LP-gas taxable use in motor vehicles, other than in highway vehicles, would largely be confined to the industrial truck. Our calculations based on the number of LP-gas powered industrial trucks in use at the end of 1976 and the average usage indicate that the tax involved would not exceed eight million dollars a year.[3] Tax total would be lower with reduced industrial activity.

E. The foregoing factors calling for tax revision were recognized in the energy related provisions (Title 20) of H.R. 10612, the 1976 Tax Reform Act, as passed by the Senate, through providing for refund of tax when non-highway use was involved. However, these energy related provisions were removed by Senate-House Conference as not pertinent to the thrust of the Act. We do recommend that the objectives can be better accomplished, tax handling simplified, and cost to government and user alike eliminated through tax revision to remove initial imposition of taxation, rather than adopting the refund route.

Therefore, in the interest of efficient use of natural resources, encouragement of use of clean fuel, and competitive equity, we recommend that the existing special motor fuel tax law be modified to limit tax application to special motor fuel use in a highway vehicle, or if such proposal covers too broad a field of the tax producing special fuels, which we consider unlikely, the motor fuel taxation of LP-gas be limited to use in a highway vehicle as is the present treatment provided for diesel. We suggest the following amendatory language:

SUGGESTED TAX REVISION

Sec. 4041. Imposition of Tax

(b) Special motor fuels. There is hereby imposed a tax of 4 cents a gallon upon benzol, benzene, naphtha, liquified petroleum gas, casinghead and natural gasoline or any other liquid (other than kerosene gas oil, or fuel oil, or any product taxable under Sec. 4081 of subsection (a) of the Section):

(1) Sold by any person to an owner, lessee or other operator of a highway motor vehicle or motorboat for use as a fuel in such highway motor vehicle or motorboat; or

(2) Used by any person as a fuel in a highway motor vehicle or motorboat unless there was a taxable sale of such liquid under paragraph (1).

(Strike remaining language of Sec. 4041)

III.

It has been firmly established that the nation is experiencing a continuing and growing shortage of natural gas. Recognition of this is reflected throughout the "National Energy Plan", and in particular in the proposed National Energy Act which would discourage use of natural gas by utilities and industry.

[3] Based on a "1000 running hour level common to many operations" (Plant Engineering Magazine articles 1973–74) multiplied by LP-gas trucks in use at end of 1976.

In spite of the demonstrated critical scarcity of natural gas, the Farmers Home Administration (FmHA) is making Community Facility loans available for the purpose of extending natural gas use to consumers who presently are served by alternative energy sources. Not only is this a questionable interpretation of the "Rural Development Act", but more seriously it directly conflicts with the goals of the "National Energy Plan."

This activity results in a waste of energy resources. A recent example of this occurred in the Marietta, Texas region where FmHA granted a loan for extension of natural gas lines into areas adequately served by propane and heating oils. To illustrate the adverse effect of such a grant on energy resources, this extension of natural gas service at Marietta removes natural gas from distribution systems in other areas of the country affected with natural gas shortages. Where this natural gas shortfall occurs in an area served with synthetic natural gas (SNG), using propane as a feedstock, the result is an inefficient use of propane as SNG feedstocks at that point, with a loss of up to 10 percent in energy content, to substitute for natural gas lost through extension of lines that at the location of extension simply replaced an existing energy source. In this chain of circumstances 10 percent of the energy has been lost.

Applying the limited funds of the public treasury for the purpose of constructing distribution facilities, which will unnecessarily add to the number of consumers of natural gas, is a misuse of Federal monies. It is also an endorsement and support by a Federal agency of an undertaking which is unnecessary and one which adds to the depletion of fuel, of which there are diminishing reserves, in complete opposition to national policy and the public interest.

In order to avoid this type of circumvention of the purpose and intent of the "National Energy Plan", and to prevent the waste of tax revenues it is respectfully suggested that the use of Federal funds, for the construction and/or extension of natural gas transmission facilities to consumers presently served by existing energy sources, be considered contrary to the goals of the "National Energy Act", and prohibited by amendment to S. 1472.

We will appreciate Committee consideration of the recommendations relating to the Tax Aspects of the Comprehensive National Energy Plan as presented herein and urge their adoption.

METROPOLITAN TAXICAB BOARD OF TRADE,
New York, N.Y., August 5, 1977.

SENATE COMMITTEE ON FINANCE,
Dirksen Senate Office Building,
Washington, D.C.

HONORABLE SIRS: The Metropolitan Taxicab Board of Trade, is a trade association whose members are the owners of 98% of all fleet medallioned taxicabs in the City of New York. These are fleets which own more than two medallion taxicabs each. Our membership presently own and operate approximately 3,300 medallion taxicabs in New York City. As recently as 1972, our members owned and operated approximately 6,700 taxicabs in New York City, but as a result of a series of financial difficulties the fleet industry has been forced to liquidate and/or sell off its taxicabs and medallions so that we own and operate approximately one-half of the number of vehicles we had in 1972. One of the major contributing factors to the financial disaster which struck this industry was the runaway increases in the cost of gasoline. The medallion taxicab industry is one of the major users of fuel in New York City, and the entire industry used about 45 million gallons of gasoline per year. Much of this fuel was purchased through a co-op in bulk. Today we are paying over 250 percent more for that same gasoline and, as a result of the anti-pollution equipment installed in our vehicles, are getting considerably less mileage per gallon.

The medallion taxicab industry in the City of New York carries more than 800,000 passengers per day. This is more than all of the buses in the City of New York carry each day and is second in total passenger traffic only to the New York City subway system. We are certainly an intrinsic and essential part of the mass transportation system in New York.

It is our understanding that the primary motivation for the proposed legislation to increase the Federal tax on gasoline is to discourage and reduce the amount of gasoline being used in this country. Increasing the cost of gasoline to the private user may tend to inhibit the amount of gasoline such private user will consume. However, it will not inhibit or limit the amount of gasoline used by mass transportation vehicles. Our vehicles must be on the streets 18 hours a

day, 7 days a week, in order to fulfill the requirements imposed on fleet medallion taxicabs to supply their essential service to the public. The imposition of this tax against the licensed medallion taxicab industry would be punitive, in the nature of a penalty tax.

The imposition of an increased Federal gasoline tax could not be expected to contribute to the diminution of the utilization of gasoline by the taxicab industry. Indeed, were the increased tax to inhibit use of private automobiles, it could be reasonably anticipated that taxicab usage and its part in mass transportation would be increased. It must be recognized that such increased usage would be the direct result of fewer automobile commuters and would, in fact, reflect the more efficient allocation of gasoline resources.

It is our sincere belief that the imposition of additional gasoline taxes on a mass transportation industry will be counterproductive to the goals of the proposed legislation. If the gasoline tax is increased further and the industry is thereby compelled to seek an increase in the rate of fares, it will not tend to discourage the private individual from using his car if it is going to cost more money to use mass transportation facilities. The major impact additional gasoline taxes will have on the taxicab industry will be to increase costs thereby increasing rates and further contributing to inflation.

The industry has already been so crippled by dramatically escalated costs in recent years that it has been forced to sell out approximately half of its vehicles to individuals who are really buying themselves a job, since they drive the cabs themselves.

In the majority of these cases, one individual drives the cab himself in place of the 4½ employees per taxicab utilized by the fleets to provide 24 hour, 7 day a week service. The industry is one of the largest employers of minority persons in the City of New York, with over 60 percent minority representation. These sales have already resulted in the loss of approximately 14,000 jobs in the taxi fleet industry in the City of New York. In addition, the industry contributes almost five million dollars per year to union health and welfare funds providing hospitalization benefits for all employes and their families and more than two million dollars per year to a pension fund for the benefit of the industries' employees. The individual drivers who own their own taxicabs do not make such contributions and do not have these benefits.

With so many fleets already being forced out of business, the imposition of additional Federal gasoline taxes can only accelerate the demise of the fleet industry, while in no way contributing toward the diminution of the utilization of gasoline. The fleets that are forced out of business transfer their cars to individuals who will continue to consume the precious fuel and take home less earnings for their work each week.

We implore your Committee to exempt publicly licensed taxicabs from any additional Federal taxes which may be imposed on gasoline.

Very truly yours,

GERALD W. CUNNINGHAM, *President.*

STATEMENT OF JAMES W. CUMPTON

The Energy Tax Act of 1977, as proposed, is a proposal to enact penalty taxes on oil and gas production. It would be unsound as a solution to our energy problem, inflationary and a depressant on the American economy. Probably worst of all, it would be an unfair burden on all citizens who consume energy as they would be forced to pay tribute to government in the form of hidden taxes. Even if there were a rebate of the tax, the cost to both business and government of collecting and rebating would be an unproductive economic burden.

The proposed tax and price controls are defactor partial socialization of American owned domestic oil and gas. What fairness or equity is there in denying the owners of oil property current fair market value for their property simply because they purchased it or developed the production sometime in the past at a lower cost? Using that logic (?) crops raised on land purchased at $500. an acre 30 years ago would be taxed or price controlled to 20 percent of the price for crops raised on adjoining land purchased this year for $2,500. an acre. Even those who favor socialism should recognize that the collection of the tax and the rebating of administrative costs would be an unproductive burden benefitting no one.

The program would create a sterile layer of costs which would burden our economy and add to inflation. Even more important, it would be counterproductive to our efforts to solve our energy problem. In short, it would be a "rip off" of Ameri-

can citizens and in the long run it is the consumers, especially those in the Northeast, who would suffer most of all. The great beneficiaries would be the foreign oil interests.

We need legislation to encourage capital formation and investment in developing all forms of energy.

APPENDIX D

MEMORANDUM

JULY 20, 1977.

To: Finance Committee.
From: Finance Committee Trade Staff.
Re: ITC Report on the President's Gas Guzzler Tax.

During hearings on the International Trade Commission (ITC) authorization bill, the Subcommittee on International Trade requested the ITC to study the impact on the domestic automobile industry of the President's proposal for fuel inefficiency taxes and rebates. The ITC submitted a copy of this report to the Committee on July 15. The Commission's conclusions are as follows:

Sales

Without any change in law, annual sales of new passenger automobiles in the U.S. would be 14 million by 1985 (12.5 million U.S. and 1.5 million imports). In 1977, total sales will be 10.9 million (9.4 million U.S. and 1.5 million imports).

Under the President's tax and rebate proposal, sales of U.S. cars would drop to 12.2 million in 1985 while imports would increase to 1.8 million.

Under the tax proposal without rebates, U.S. sales would drop to 12.4 million in 1985 while imports would increase to 1.6 million.

Employment

Without any change in law, employment will increase from 826,000 in 1977 to 1.1 million in 1985.

Under the tax and rebate proposal, employment would be 1.05 million in 1985.

Under the tax proposal without rebates, employment would be 1.07 million in 1985.

Prices

Under both the tax/rebate proposal and the tax proposal without rebates, the prices of mid-size, full size, and luxury U.S. automobiles in 1985 would be higher than they would have been with no change in the law. Prices of U.S. subcompact and compact automobiles would be lower in 1985 under the President's tax/rebate proposal. Under the tax proposal without rebates the prices of small U.S. cars would be identical to what they would have been without any change in the law.

Prices of imported subcompact and compact passenger automobiles in 1985 under the tax/rebate proposal would be lower than they would have been if no change was made in the law. Under the tax proposal without rebates, the price of imported subcompact and compact cars will be the same as they would have been without any change in the law. The price of imported luxury automobiles would be higher than it would have been without any change in the law under the tax/rebate proposal and under the tax proposal without any rebates.

Energy Impact

The ITC believes that the U.S. automobile industry as a whole may not be able to meet by 1985 the energy efficiency standards enacted under the Energy Policy and Conservation Act. The ITC does not believe that the tax rebate proposal would help the domestic industry meet the fuel economy standards required by present law.

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MEMORANDUM ANALYSIS BY BALTIMORE GAS & ELECTRIC CO. OF PEG SNG IMPACT STUDY

At the FEA hearing held July 18, 1977, on the matter of the "General Inquiry Regarding the Allocation of Petroleum Feedstocks to Synthetic Natural Gas Plants," a study was submitted by the Petrochemical Energy Group (PEG) to demonstrated the alleged overstatement of the role of SNG in preventing curtailment of residential customers during the winter period 1976–1977. This study was furnished as Appendix C to the testimony submitted by Mr. Ralph W. Klenker.[1] It is our understanding that a copy of this study has also been furnished to the staff of the Senate Energy and Natural Resources Committee, which currently has under consideration a number of bills potentially affecting the gas industry, and more particularly, synthetic natural gas manfacturing facilities.

As a part of its analysis of the statement appearing on page 57 of the National Energy Plan, issued April 29, 1977, to the effect that ". . . the 13 SNG plants that were operating this winter provided the additional margin of natural gas supply that kept several areas of the country from shutting off residential users during the coldest months," the PEG study specifically discussed 11 of the operating SNG facilities, including the Company's Riverside SNG Plant. Each discussion contains a number of factually inaccurate statements, but more importantly, each draws a number of patently, unwarranted conclusions with respect to the actual and projected operation of the SNG plants and the use or sale of natural gas by the SNG plant operator/owner for electric generating purposes. While there exists an almost uncontrollable temptation to enter into a semantic discussion regarding the PEG study discussion regarding the PEG study discussion of the Riverside SNG Plant, this memorandum will focus only on the inaccurate factual statements and the unwarranted conclusions.

1. In the heading and again in the first paragraph of the analysis of the Riverside SNG Plant, the company name is incorrect.

2. The statement, ". . . their SNG plant, originally scheduled for start-up in December 1976 did not make its initial start-up until February 7, 1977," appearing in the first paragraph is factually inaccurate. In actuality, the Riverside SNG Plant was initially fired on December 28, 1976, and operated in a testing mode until late in the day of December 31, 1976. It was re-started on February 7, 1977, shut down later on the same day, and started again on February 16, 1977. In addition, the footnote reference for this statement is incorrect since the FEA Order of April 7, 1977, did not contain the information referenced. This same inaccurate statement and misleading footnote reference occur in the first paragraph under the section entitled, "SNG Production," on the second page of the PEG analysis.

3. While the first sentence of the second paragraph of the analysis of the Riverside SNG Plant to the effect that "BG&E apparently had sufficient gas supply to use 18,000 Mcf for electric generation in January 1977" is factually correct, it is imperative to note that these volumes of gas were employed in the Company's electric generating peaking units at its Notch Cliff facility. Pursuant to the Company's interconnection arrangement with the PJM interchange, the Company is required to operate its gas-fired turbine electric peaking units in times of "max emergency." "Max emergency" occurs when the PJM operating reserves are temporarily reduced due to loss of capacity or heavy load, such that available gas-fired peaking units of member companies must be operated to make up for this reduced capacity to avoid load curtailment, voltage reduction or similar emergency measures. Such generation is the least economical means of generation and is therefore employed only in emergency situations.

The Company's peaking units operated on January 12, 13 and 17 on this "max emergency" basis; approximately three hours on January 12, less than two hours on January 13 and between four and five hours on January 17. On January 21 these same units were operated for approximately one hour as required by the PJM interconnection agreement for biannual test purposes. It is interesting to note that the 18,000 Mcf used for electric generation in January 1977 represents .13 percent of the 13,046 MMcf of gas sendout during that month.

[1] The study referred to was included as part of the record of these hearings, Vol. II, p. 430.

It is, therefore, a patent overstatement to state, as the PEG analysis goes on, that "BG&E had more than ample supplies [of natural gas] to meet the winter needs of residentials." Such a statement and the obvious implications therefrom have no real bearing on the need for the Riverside SNG Plant.

4. In the second paragraph under the section entitled, "SNG Production," the last sentence states that this Company "recognizes that supplemental gas will not solve the gas supply shortage" and by footnote references page 8 of the Company's 1976 Annual Report to Stockholders. It is important to note the context in which the Company's statement, relative to supplemental gas, is made in the Annual Report. The actual language appearing on page 8 is "Supplemental gases can compensate for only a relatively small portion of the natural gas lost through continuing pipeline curtailments. . . ." The plain meaning of that statement is a far cry from the statement attributed to this Company by he PEG analysis.

5. In general, it is important to set the description of the Riverside SNG Plant contained in the PEG analysis in proper prospective. While that plant is designed to produce 60,000 Mcfd for 180 days per year, the Company has consistently taken the position that the plant will be operated only for peak shaving purposes and will not be used when other than "firm" customers are on line. To imply that the Riverside SNG Plant will produce 60,000 Mcfd for 180 days per year, regardless of operating conditions, is patently misleading. In the same context, while the production of 60,000 Mcfd of SNG does amount to approximately 10 percent of the Company's total daily maximum gas requirements in mid-winter, it is misleading to state or, otherwise infer, that the Company will become dependent upon that portion of its supply "to service its residential customers."

6. While the National Energy Plan speaks in terms of the "shutting off residential customers," FEA's SNG regulations and administrative pronouncements have always focused on service upon customers in FPC priority of service categories 1, 2 and 3, whether they be residential, commercial or industrial. The implication that FEA policy with respect to end-use has focused on residential requirements is also misleading. There is no such limitation. The industry has consistently taken the position that end-use restrictions for SNG is beyond the statutory or regulatory jurisdiction of FEA.

RESPONSE OF BOSTON GAS TO CLAIMS OF THE PETROCHEMICAL ENERGY GROUP

The statement of President Carter on page 57 of "The Nationl Energy Plan" pertaining to the contribution of the thirteen operating SNG plants in meeting residential service this winter is appropriate with respect to the Boston Gas' SNG plant. The operation of this plant played a major role in meeting the needs of Boston Gas' customers last winter. Moreover, FEA has recently granted the full allocation of propane feedstock requested by Boston Gas for use during the next three years in its SNG plant. In the comprehensive and expensive proceedings leading up to FEA's decision, the issue of SNG efficiencies versus those of propane-air in Boston Gas' system was fully addressed. The results of the FEA proceedings indicate FEA's agreement with Boston Gas, and its disagreement with PEG to the effect that SNG is the more desirable form of peak-shaving for Boston Gas.

PEG has raised the inaccurate inference from a selective citation out of context of public information that SN did not play this role. A more thorough review of the public information that SNG did not play this role. A more thorough review of the public information pertaining to Boston Gas' SNG plant contradicts PEG's conclusion. In its application for allocation of synthetic natural gas feedstock, dated July 12, 1976, and in its supporting testimony (the "FEA application"), all of which PE is intimately aware of as a party to the proceeding, Boston Gas set forth full and complete particulars demonstrating the importance of and crucial need for the SNG plant in Boston Gas' overall gas supply picture.

PEG'S statement that "Boston Gas already had peak-shaving facilities capable of more efficiently producing the same volumes of supplemental supplies of gas even before construction of the SNG plant" is erroneous and misleading. PEG bases its grossly oversimplified claim by merely equating the capacity of the SNG plant to previously existing propane air production capacity. PEG has chosen to overlook key information with which it was familiar in the Application which adequately demonstrates the opposite of PEG's conclusion.

First, the SNG plant allows Boston Gas to peak-shave its integrated distribution system from one centralized location and realize operating efficiencies

which result in lower costs to the consumer. This is because SNG is completely interchangeable with pipeline natural gas and, accordingly, can be injected into the distribution system in unlimited quantities without customer appliance problems. Propane air, on the other hand, has limited interchangeability and must be injected into the distribution system in correct proportion with volumes of natural gas at several different points and in amount and heating value which are dictated by the combustion criteria of customer appliances. Propane air is produced at a heating value of 1,350 to 1,400 BTU/cu. ft) to meet these constraints. There are also inherent safety problems associated with producing a propane-air natural gas mixture with a specified gravity greater than 1. This problem is further expained on page 23 of the FEA Application. These interchangeability constraints alone are sufficient reason to rule out PEG's contention that propane-air could have filled the role of the SNG plant.

In addition, from a logistical standpoint, it is questionable whether Boston Gas could have directed adequate volumes of natural gas to the numerous points of propane air injection in its distribution system. This is particularly relevant during this past winter when Boston Gas' pipeline curtailments were undergoing almost daily changes due to the unusually high demands experienced by pipeline suppliers. Moreover, the ability of Boston Gas to peak-shave with propane air alone has been limited by the fact that Boston Gas in recent years has dismantled two of its propane air plants at key locations in its distribution system. This dismantling, completed after the construction of the SNG plant, was done in recognition of SNG as the superior peak-shaving method.

Another problem which PEG appears to have forgotten is that operation of these decentralized propone air facilities requires extensive truck transportation of propane. These plants have limited storage capability, and extended operation of them requires additional operating manpower and around-the-clock trucking to maintain the appropriate production rates. Such rates are easily handled by the SNG plant which receives its propane via pipeline, thus avoiding the expensive truck transportation and labor costs attendant to decentralized propane air facilities. Boston Gas is further bounded in its ability to move the required volumes of propane to these facilities by contractual arrangements with its suppliers and the availability of sufficient transportation equipment.

Based upon the foregoing analysis, PEG's argument that Boston Gas had sufficient peak-shaving capability absent the SNG plant by equating SNG and propane air capacities is groundless. And, the FEA, in granting an allocation of the full amount of propane requested by Boston Gas for use as SNG feedstock (decision and order of FEA, received April 26, 1977, in the matter of Boston Gas Company propane feedstock allocation) obviously agreed with Boston Gas, despite PEG's efforts in opposition, that Boston Gas' SNG production is superior to propane air.

Also in error is PEG's claim that ". . . a propane-air injection plant can be started up as the need arises and thereafter shut down when the need has passed." This is another oversimplification which fails to consider the interchangeability and safety problems mentioned before. Before propane air can be injected, sufficient volumes of natural gas must be available for mixing to ensure satisfactory operation of customer appliances and to avoid heavy specific gravity mixtures which post safety problems to consumers. Diversion of sufficient volumes of natural gas to the injection point "when the need arises" is not always possible in light of pipeline curtailment considerations which occur during cold weather. Thus, the starting up and shutting down of propane air plants is not as simple as PEG would lead one to believe.

PEG alludes to the inefficiencies of using propane as a feedstock in an SNG plant. PEG is referred to FEA's Order of March 8, 1974 to Boston Gas Wherein FEA states that "peak-shaving with so-called substitute gas is a more efficient use of propane than peak-shaving with propane air mixtures." In addition, the question of SNG efficiency versus that of propane air was thoroughly treated in the FEA Application, and FEA's Order cited above hardly supports PEG's claim of F&G inefficiency.

By way of other illustration of the lack of thoroughness with which PEG supports its claims, PEG states that "In 1976, Boston Gas produced 7.2 BCF of SNG, or 11 percent of its total firm sendout." PEG has misread the source they used in support of this statment. The source (Eastern Gas and Fuel Associates' Form 10K (1976), filed with the Securities and Exchange Commission on March 24, 1977, page 7) actually states, "Of this quantity (firm sendout for the twelve-

month period ending August 31, 1977) . . . 7,150,000 MCF" will be obtained "from Boston Gas' *LNG and SNG* facilities" (italics added for emphasis). The 7.15 BCF cited by PEG represents LNG as well as SNG. Thus, PEG's calculations of the percentage of SNG in Boston Gas' firm sendout are in error.

Next, PEG claims that gas sold to interruptible customers "could clearly be marshaled to offset any necessary for SNG production." This Statement exhibits an obvious lack of knowledge of both the gas industry and the underlying circumstances pertaining to interruptible sales. A gas utility has an overriding responsibility to see that the demands of its customers are met for the coldest expected weather. To execute this responsibility, Boston Gas must provide for sufficient supplemental supplies over and above those supplies available from the pipeline to meet those needs. In the event that the coldest expected weather is not experienced during the winter heating season, volumes of gas intended to meet this weather would become available in the following summer for interruptible sales. On the other hand, if the coldest expected weather is realized, no gas would be available for interruptible sales.

To "marshal" interruptible gas to the extent that it is available "to offset any necessity for SNG production" as PEG suggests would require additional expensive storage facilities which are not available to Boston Gas; and, if such hypothetical storage were available, it is questionable whether such supplies could be delivered when needed, owing to the severely taxed carrying capacity of the pipelines. In the FEA Application, Boston Gas showed that it had purchased the full amount of firm storage available to it. Thus, contrary to PEG's argument, interruptible gas sales cannot be used to offset SNG production.

The assertion by PEG that "SEC filings reflect the adequacy of Boston Gas supply even without SNG as far as being able to serve its residential users even without SNG" is erroneous and exhibits an attempt by PEG to trample upon known facts. The statements made in the references quoted by PEG (Eastern Gas and Fuel Associates' Form 100 for the quarter ending March 31, 1977, and Eastern Gas and Fuel Associates Form 10K for 1976) as to the adequacy of Boston Gas supply assume the inclusion of SNG as a vital component of that supply. As stated before the public information available to PEG and with which PEG is familiar from its participation in the FEA Application proceedings thoroughly contradicts PEG's claims.

PEG's final statement that Boston Gas has unused LNG capacity which could be used to obviate SNG production is also erroneous and represents another attempt to twist the facts to suit PEG's contentions. PEG correctly observes that Boston Gas "expected to receive 7.150 BCF in gas supply from its SNG *and* LNG facilities" (italics added for emphasis) from a reference (Eastern Gas and Fuel Associates Form 10K, page 7) which they previously quoted to support the notion that the 7.15 BCF was entirely attributed to Boston Gas' SNG plant. However, as properly stated in the Form 10K, this volume is composed of *both* LNG and SNG volumes and, therefore, has clearly been manipulated by PEG to make two groundless assertions.

Next, in arriving at the figure of 7.2 BCF output of the SNG plant, PEG has overlooked the fact that Boston Gas' SNG production capability is limited to the allocation of feedstock accorded it by the FEA, a proceeding in which PEG was very much involved and fully aware of the underlying facts. Thus, the simple multiplication of the design capacity of the plant (40,000 MCF/day) by the maximum intended period of operation (180 days) to arrive at 7.2 BCF is irrelevant when one considers the true constraint of Boston Gas' FEA allocation (5.7 BCF from 1,484,047 barrels).

In consideration of the foregoing analysis, it is clear that PEG's contention that the SNG plant did not avert the termination of service to residentials this past winter is without foundation. On the contrary, the SNG plan provided an important measure of Boston Gas' supplemental winter supply without which severe hardship may have been suffered by the Company's customers.

Rebuttal Comments of the Brooklyn Union Gas Company on SNG Notice of Inquiry

Brooklyn Union believes that the Petrochemical Energy group (PEG) statement shows a complete lack of understanding or knowledge of the gas industry. By its statement, PEG, as it has done in so many SNG related matters before Federal Energy Administration (FEA), has attempted to discredit the noble

efforts of the gas industry and responsible state and federal agencies who tirelessly worked to get the country through the worst gas crisis faced to date and has concluded that companies like Brooklyn Union have sufficient gas supplies to meet all requirements, including interruptible sales and therefore have no continuing need for SNG. As this Agency should be well aware, such a "straw man" cannot stand scrutiny.

Our Company's policy is and always has been to operate its SNG plant to supply and protect its customers' high priority needs. To the extent the Company finds itself with capacity beyond these requirements during any given year and in a position to assist other gas distributors to meet their high priority needs in times of crisis, such as occurred last winter, Brooklyn Union's policy is to render such aid to the greatest extent possible.

The latter part of this response will provide detailed answers to the bold and largely self serving and misleading statements PEG has directed against Brooklyn Union. However, before proceeding to it, Brooklyn Union believes that no one, including PEG has yet established that any shortages exist in any of the feedstocks used by SNG plants. Nowhere in PEG's presentation in this proceeding or, for that matter, in any other proceeding has PEG ever alleged that any of its member companies have been denied or curtailed receipt of such feedstocks. If, in fact, a supply shortage does exist, why hasn't PEG contested refinery usage of naphtha in motor gasoline or, for that matter, FEA's recently proposed deallocation of motor gasoline. PEG arguments when reduced to simplicity are purely a matter of economics. In essence, PEG does not want competition for any feedstock whether it uses that feedstock now or might use it in the future. Outside of the refiner's share, PEG wants to control the market for all such products.

In addition, neither PEG nor FEA has justified the existing discriminatory preferences for PEG's usage of such feedstocks. In particular, PEG has not been required to justify, as has the Gas industry, its allocation by a showing of end-use markets, availability of alternate fuels, feedstock efficiency, conservation efforts or production expansion restrictions.

Brooklyn Union believes that PEG and all others utilizing such feedstock should be made to explain unbridled plant production and expansion, increased promotion of wholely worthless, useless and unnecessary products like plastic spoons, synthetics, etc., and the reasons why it pursues the use of light liquid hydrocarbons when by its own admission, alternate fuels such as heavy crude oil could be utilized.[1]

In FEA's recent DEIS on SNG feedstock usage, it concluded that SNG was thermally more efficient than substantially all other substitute fuels, that it did not result in the further increase of this country's dependency on foreign oil and that no other near term alternate fuel was available before, at least, 1985. Brooklyn Union, therefore, believes that, if PEG's claims of a shortage of supply are to be given any credence, all users of such products should stand the same scrutiny.

The PEG statement herein is not only totally false and baseless (as hereafter shown) but also is in complete disregard of the President's National Energy Plan which recognized the vital role of SNG production last winter in meeting the nation's residential heating requirements and avoiding massive unemployment in essential industries. In this regard, the President stated that present federal allocation policies are unjustifiably adverse to SNG production and must be altered.

As stated previously, Brooklyn Union now will set forth its specific objection to the PEG statement. Specifically Brooklyn Union responds to the seven page Brooklyn Union section attached to that portion of the presentation entitled "SNG's Role in Preventing Curtailment of Residentials This Winter Has Been Overstated" and the testimony of Ralph W. Kienker as follows:

1. "The experience of The Brooklyn Union Gas Company offers evidence to refute the contention at page 57 of the National Energy Plan that liquid-based SNG provided the margin of gas supplies that save residential consumers from curtailment during the winter of 1976–'77". (page 1, line 1)

The above statement is false. Brooklyn Union's plant did provide the margin of gas supply which saved many of its residential customers from full curtail-

[1] See Business Week, July 18, 1977 at p. 44.

ment of gas service.[2] In fact, the Company's SNG plant provided such a margin not only on its system but also on the systems of eight other distribution companies. These companies all approached Brooklyn Union last winter requesting SNG which was desparately needed to maintain their gas systems. All eight companies faced such severe gas supply deficiencies that they were not only faced with the possibility of curtailing residential customers but also with losing their gas systems which would have necessitated large scale turn-offs of whole sections of their service areas. Brooklyn Union, in fact, was notified by at least two distributors that they were already curtailing residential customers.

In Brooklyn Union's own case, the plant provides two essential services. It gives the Company much needed winter supply on a seasonal basis and also on a peak day. If Brooklyn Union did not have an SNG plant last winter, the Company would have been forced to draw its gas from storage much more rapidly thereby causing the complete exhaustion of its peaking supply by late January. Under those conditions, if the temperature dropped below 25° F on any day in February,[3] the Company would have been forced to cease providing any service to substantial parts of its system resulting in denying service to thousands of residential customers during the severe winter period, a wholly untenable situation.

2. "Brooklyn Union's supply situation during the recent winter heating season in fact, enabled it to make large volume sales of SNG produced at its plant to other utilities, since the SNG was not required to meet the needs of Brooklyn Union's own customers." (page 1, line 5)

Brooklyn Union was able to make off-system sales of SNG this past winter because its SNG plant is normally operated only during the winter season to meet its own customers requirements. As a result, Brooklyn Union has approximately 6 BCF of reserve summer capacity which can be used in an emergency situation. Due to the extreme cold weather in the early part of the winter, Brooklyn Union was contacted by various gas distributors desperately requesting to purchase SNG in order to maintain service to their highest priority firm customers. Brooklyn Union endeavored to provide this emergency service during the winter period by withdrawing gas from storage which could only be replaced by producing SNG during the summer period. Fortunately, during the month of February, the weather improved and as a result, with gas requirements less than normal, regular SNG production replenished storage and eliminated the need for the Company to run the plant during the summer period.

3. "Brooklyn Union continued adding new residential hookups, and sold significant quantities of gas to industrial customers, including interruptible industrial customers that presumably have alternate fuel capability." (page 1, line 10)

(*a*) While Brooklyn Union has continued to add certain new residential customers, these customers were actually replacements for load which was lost elsewhere on our system. The Company's overall requirements have not increased since 1972 and in most instances have decreased during that period.

(*b*) As for selling significant quantities of gas to industrial customers, Brooklyn Union has no significant industrial customers on its system. Last year Brooklyn Union sold 4.2 BCF (approximately 5 percent of total sales) to 4,700 "industrial" customers for an average take of less than 3 MCF per day. These customers are certainly not typical industrial customers but are more closely related to small commercial customers and substantially all of them lack any installed alternate fuel burning capabilities.

(*c*) Since its pipeline suppliers first started curtailing deliveries of natural gas, Brooklyn Union has steadfastly maintained a policy of no planned sales of interruptible gas. However, Brooklyn Union has sold small interruptible quantities, ranging from 1.1 to 4.8 percent of total sales. The reason for such sales is obvious. Firm requirements are directly related to temperature in that, as temperature decreases, requirements increase. Prudent planning dictates that a gas distributor should begin the winter season with enough gas supply to meet a design winter. To the extent that the weather is warmer than design conditions, then to the extent storage, exchange deals or other methods of preserving supply are not possible, small quantities of gas may be available for sale to

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[2] Last winter, even with the SNG plant, Brooklyn Union was forced to curtail service to many small industrial customers for limited periods of time thereby adversely affecting many thousands of jobs in our service territory.

[3] This actually occurred on 6 days during February, 1977.

interruptible customers. The difference between Brooklyn Union's requirements at normal and at design is in excess of 7 BCF. Brooklyn Union, however, has always attempted to keep interruptible sendout to a minimum by monitoring its winter supply and sendout on a daily basis. Brooklyn Union has for many years been involved in increasing its storage capacity to minimize interruptible sales thereby increasing its ability to husband all sources of gas supply to meet the needs of our high priority customers.[4] As soon as SNG is no longer required to meet the requirements of the coldest expected remaining period at any point in the winter, then the plant is shut down. If the remaining period is as cold as expected then no volume will be available for interruptible sale.

4. "Possibly the most significant fact is that Brooklyn Union does not anticipate that it will be necessary to operate its plant at full capacity even in the upcoming winter heating seasons." (page 1, line 14)

Brooklyn Union certainly does not plan to operate its plant at full capacity in the upcoming winter heating seasons under normal weather conditions. The Company attempts to keep the cost of gas to its customers at a minimum and since SNG is its most expensive gas, no more SNG will be produced than is necessary. The plant will not operate at full capacity under normal weather conditions but will be available up to its design capacity only to provide gas needed to meet colder than normal weather.

5. "As a measure of Brooklyn Union's healthy supply posture, Brooklyn Union produced only 5,885,237 MCF in 1976 at its SNG plant, or almost 5,000,000 MCF less than its plant's design capacity." (page 2, line 1)

The above statement is a clear example of PEG's lack of understanding of a gas distributor's operations. The fact that Brooklyn Union produced only 5,885,237 MCF in 1976 is not a reflection of Brooklyn Union's healthy supply posture but of the weather conditions which prevailed during that period. The winter of 1975–76 was 342 degree days warmer than normal. This means that our firm requirements were 4,035,000 MCF less than normal and 11,235,000 MCF less than at design conditions.

As explained in response 3C above, when the SNG plant was no longer needed to meet the coldest expected remaining period, it was shut down.

6. "The average cost of production of the SNG manufactured at Brooklyn Union's SNG plant is $3.24/MCF. Brooklyn Union, however, has made short-term sales of SNG to off-system customers at prices ranging between $4.00/MCF–$5.09/MCF." (page 4, line 3)

The implication here is that Brooklyn Union has sold SNG at a profit which is certainly not the case. The average cost of production includes only variable costs and does not include the capital costs of the SNG plant which averaged $1.25 per MCF and which must certainly be recovered in the selling price of SNG. During this winter naphtha purchased from our supplier under our allocation varied between $2.75 per MCF and $3.84 per MCF. The $1.25 capital cost was added to these commodity charges to result in a selling price of either $4 or $5.09 per MCF depending on which priced naphtha was used for the sale.

7. "As mentioned earlier, Brooklyn Union has projected gas supply surpluses over requirements in the following amounts: 16,945 MCF/Yr. in 1977–78; 17,611 MCF/Yr. in 1978–79; and, 15,921 MCF/Yr. in 1979–80." (page 6, line 7)

The surpluses referred to above were quoted from the 1976 New York Gas Report and reflect various optimistic gas supply assumptions, all of which must materialze before such surpluses could exist. We have incorporated the curtailment projections of our pipeline suppliers which have historically been underestimated. We have also assumed full deliveries from our production subsidiary and from our imported LNG projects. The volume of gas which we have received to date from our production subsidiary has been approximately 10 percent of the expected quantity. We also assumed full deliveries of our import LNG which would be more than three times the quantity delivered in any annual period to date. In the five years for which we have contracted for LNG deliveries, we have received our full contract quantities yet. In fact, in some years we received no imported LNG at all.

A good indication of the reliability of the estimate of surpluses is that in the 1977 New York Gas Report the surpluses, using more recent, but again optimistic assumptions, read as follows: 11,349 MMCF in 1978–79; 11,270 MMCF in 1979–80, and 7,274 MMCF in 1980–81. If SNG were excluded under the most optimistic

[4] Since 1973, Brooklyn has increased its storage capacity by approximately 50 percent.

circumstances, the samples shown would be insufficient to meet a design winter in the first two years and starting in 1980–81, a deficiency of supply would occur.

Also it must be realized that these surpluses are estimated at normal weather conditions and that cold weather would reduce these projected surpluses by more than 7,000 MMCF.

8. "By the start of the 1977–78 heating season, Brooklyn Union will have 11,429,540 MCF of gas in storage, as a result of storage service provided by Transcontinental Gas Pipe Line Corporation at its Washington Storage Field in Louisiana. The availability of this quantity of gas to Brooklyn Union customers during future heating seasons will more than offset the total production of Brooklyn Union's SNG facility in these periods." (Page 7, line 13)

The above statement is either another indication of the lack of understanding of the gas industry or is intended to mislead the reader. While it is true that Brooklyn Union has increased its Transco storage by 11.4 BCF, this does not increase the Company's overall gas supply. Gas is placed into storage during the summer period and withdrawn during the winter period. Any gas that is withdrawn from storage during the winter period must be replaced during the following summer or it will no longer be available. The sole purpose of storage is to shift gas from the summer to the winter, not to increase supply. Brooklyn Union has increased its storage in order to minimize interruptible sales and maximize the use of its supplemental supplies to the benefit of its high priority customers.

9. "Brooklyn Union Gas produced expensive SNG last winter costing $3.25 per Mcf, but did not take advantage, even at the height of the winter shortage, of purchases under ENGA at a maximum of $2.25 per Mcf. Moreover, Brooklyn Union has apparently used SNG to fill storage facilities when $2.25 ENGA gas remains available through August 1." (Testimony of Ralph W. Kienker, page 12)

This statement is both false and misleading. Between November 1, and February 3, Brooklyn Union purchased 2.0180 BCF of gas under ENGA. In fact, Brooklyn Union purchased as much gas under ENGA as was available to it during the early phase of the critically cold weather last winter. However, as the bad weather continued, the sources of ENGA gas disappeared thereby leaving Brooklyn Union to rely upon its own sources of supplemental supply. Further, as the weather picture improved in February and March, and Brooklyn Union, finding itself in a better posture than most of its sister utilities because of its supplemental gas supplies, released its entitlements under ENGA to allow other less fortunate utilities the opportunity to replenish their severely depleted storage supplies.

Although Brooklyn Union is not familiar enough with the operations of the other pipeline and distribution companies mentioned in the PEG presentation, it can only assume that PEG's erroneous and ill conceived treatment of Brooklyn Union's situation is repeated.

Brooklyn Union therefore respectfully requests that FEA totally disregard PEG's presentation in this mater as totally fallacious, meritless and intentionally misleading.

PUBLIC SERVICE ELECTRIC AND GAS COMPANY RESPONSE TO PEG STATEMENTS IN FEA TESTIMONY

Public Service Electric and Gas Company (PSE&G) has always practiced, and will continue to practice, the policy of utilizing those sources of gas supply which result in the maximum cost benefit to its customers, consistent with reasonable operating practices and supply availability. Thus, PSE&G considers it appropriate to comment on the statements made by the Petrochemical Energy Group (PEG) about PSE&G in Appendix C of the testimony submitted by Mr. Ralph W. Kienker on the matter of the "General Inquiry Regarding the Allocation of Petroleum Feedstocks to Synthetic Natural Gas Plants." There are six items in particular in that Appendix about which PSE&G feels PEG has misrepresented the facts as to the importance of an SNG supply to PSE&G.

The first item, taken seriatim, is the inference that it is important to protect only residential customers from curtailment. PSE&G is equally concerned with maintaining firm service to schools, nursing homes, hospitals, commercial firms and even industries, none of which have alternate fuel capability, who require

gas service in order to continue business and current employment levels. The fact is that it was the production from PSE&G's plants which prevented the curtailments of firm customers from being deeper and more lengthy during the 1976/77 winter cold spell, which was the severest in 100 years. The New Jersey Department of Labor and Industry estimated that gas service curtailments last winter resulted in the loss of up to 50,000 jobs and lost wages of $10 million in the State of New Jersey. The State has been suffering from high unemployment levels and the above loss added to an already unacceptable situation. It should also be noted that the total output of the two SNG plants last winter equaled the heating requirements of approximately 69,000 homes.

Secondly, PEG indicates in several places of its testimony that SNG accounts for only 6 percent of PSE&G's supply on a peak day, inferring that PSE&G's SNG production is not significant and is unneeded to maintain service to high priority customers. This figure is calculated on the basis of 100 percent availability of all supplies.

Taking into account curtailments of natural gas and storage deliveries, which PEG admitted to ignoring, the figure was closer to 9 percent of last winter's peak day supply. Of equal importance to the peak day consideration is the seasonal need for SNG production. The two plants have the capability of producing about 18 billion cubic feet during the five month heating season. This is approximately 13 percent of last season's available supply. Our SNG plants are rendering an invaluable service to the high priority customers of New Jersey. It was the additional gas supplies from the two SNG plants which prevented the curtailment of service to PSE&G's firm customers from extending beyond the nine-day period which was experienced last winter.

The third item is the allegation that PSE&G utilizes SNG to serve interruptible customers and for electric generation fuel. PSE&G does not operate SNG plants to supply interruptible loads including generation of electricity. PSE&G follows the practice of utilizing storage and interruptible loads to help balance year-round supplies of natural gas against summer-winter firm load requirements. SNG is produced to help meet winter natural gas supply shortfalls that can vary considerably depending on the severity of the weather.

The fourth item of contention centers around PEG's allegation that PSE&G had added 2 billion cubic feet of new load in 1976, when the gas supply on the PSE&G system was so tenuous. The fact is that PSE&G did not add the full 2 BCF of new load and what additions it did make did not result in load growth. During the period from 1973 to the present, PSE&G has been experiencing a steady loss of high priority sales which has reached a level of approximately 15 BCF. This loss is the result of conservation, but more particularly to attrition due to a State imposed moratorium on connecting any load even though such connection would be replacing only that high priority load leaving the system. PSE&G's approach to attaching new customers is one of extreme caution that will result in substantial benefits to the State of New Jersey as a whole. The availability of gas to new high priority customers will encourage industrial expansion, stimulate new construction and provide employment which is needed to benefit the overall economy.

It is also important to recognize that PSE&G has been taking self help measures to solve the supply problem in order to fully serve the gas market in New Jersey. Further potential customers who cannot obtain gas will switch to oil. This represents not only an inefficient use of a fuel, but also increases our imports of oil and consequently deteriorates the Nation's balance of payments. In regard to last winter's crisis, it must be remembered that the extreme sustained cold spell has been described as the worst in 100 years and under any given set of circumstances, including unusual weather, national disaster, or equipment failure, supply problems can materialize.

The fifth item is the inference made by PEG that PSE&G attempted to sell SNG to South Jersey Gas Company for $5.50 per Mcf while charging itself only $1.43 per Mcf for gas used for its electric operations. PSE&G does not produce SNG for its electric operations. The only fuel supplied for electric generation is natural gas principally during the summer months and only after all gas customer requirements are met. South Jersey Gas Company entered into a requirements type contract for a supply of SNG which was to be produced by PSE&G during the 1974/75 winter season. Since that winter season turned out to be mild, South Jersey Gas Company did not need the SNG to meet its load and elected not to purchase it. As a result, PSE&G did not produce the SNG.

The final item is the inference that PSE&G is in violation of the Federal Energy Administration's Special Rule No. 1 in regard to SNG produced in its two plants. The fact is that PSE&G's two SNG plants are not subject to Special Rule No. 1. The two plants are "grandfathered" under the FEA regulations.

It is apparent from the PSE&G related material contained in Appendix C that the Petrochemical Energy Group either has a complete lack of knowledge and understanding of the Gas Distribution Industry or has assembled facts and figures out of context in such a manner as to discredit PSE&G's need for SNG, in an attempt to maintain a privileged position in securing naphtha supplies.

RESPONSE TO PEG'S JULY 18, 1977 STATEMENT CONCERNING ALGONQUIN'S SNG PLANT

It should be noted at the outset that PEG in its July 18, 1977 statement does *not* dispute the vital contribution to continued service to residential customers represented by Algonquin's SNG plant during the past winter. PEG concedes that the conclusions of the President's National Energy Plan with respect to SNG plants "cannot be categorically denied as applied to Algonquin and its New England service area," but believes that there are "enough questions" regarding the past use of this SNG to warrant "a detailed investigation." Apart from the fact that PEG has provided no explanation whatever why the numerous Federal Power Commission and Federal Energy Administration proceedings on this subject have not sufficiently ventilated all pertinent facts with respect to the Algonquin SNG plant, the "questions" raised by PEG are based upon factual misrepresentations which require a general response so that the record will not go uncorrected.

One prominent factual error in PEG's statement is its allegation that "Algonquin's regular customers have never contracted to purchase from Algonquin its full plant output." In support of this allegation PEG cites certain sales of minor volumes of SNG to off-system customers, and states that such sales are to continue until 1979. The fact of the matter is that Algonquin's regular customers originally contracted to purchase the entire 118,200 MMBtu per day output of the SNG plant, but phased their purchases so that the entire plant output would not be purchased until the 1979–80 season. In any event, the maximum amount of off-service sales during this initial period totalled less than 10.6 percent of daily capacity. Furthermore, because of anticipated gas supply problems, certain of Algonquin's on-system customers have now committed to purchase all of the remaining available capacity of Algonquin's SNG plant. As a result, all of Algonquin's SNG capacity will be devoted to serving Algonquin's regular distribution customers commencing with the 1977–78 season.

PEG also alleges that Algonquin was unable to sell a portion of its SNG production during 1976–77, citing an application filed by Algonquin in February 1977 to sell an additional 500,700 MMBtu. As the record before the FPC makes clear, Algonquin was granted the requested authority to sell this volume of SNG on March 10, 1977 in Docket No. CP77–209. This sale of SNG was subsequently made and reported to the FPC by Algonquin by letter of May 17, 1977. Thus PEG's assertions as to this matter are factually incorrect.

PEG in its statement makes the additional allegation that Algonquin "has failed to provide FEA with the data that FEA has requested to enable the agency to proceed with its review of Algonquin's naphtha allocation request." What PEG neglects to mention is that matters relating to the Algonquin SNG naphtha allocation are currently being litigated in the United States District Court in Boston, Massachusetts in Algonquin SNG, Inc. v. Zarb, Docket No. 76–3697–M. It should be noted that this suit involves not only matters related to Algonquin SNG's naphtha allocation but also calls into question the authority of the FEA to implement its Special Rule No. 1 (10 C.F.R. § 211.29) when the FEA has determined that no shortage of naphtha exists. It is obvious that resolution of these fundamental issues may moot the relatively insignificant procedural matters to which PEG refers.

PEG also attempts to make much of the fact that Algonquin has arranged through Texas Eastern Transmission Corporation for storage capacity from Consolidated Gas Supply Corporation, which storage will be made available to certain of Algonquin's customers. If by its allusions to this storage PEG means to imply that the existence of this storage somehow reduces the critical need of

Algonquin's customers for SNG, then PEG is totally in error. It is only by means of utilizing all sources of supplemental supply, and by augmenting winter supplies with volumes withdrawn from storage, that Algonquin's customers have been able to assure service to their residential customers.

The primary purpose of storage is to ensure that volumes of gas that would otherwise be utilized during the summer will instead be utilized during the winter when high-priority requirements are most critical. It is obvious that gas withdrawn from storage must be replaced by storage injection during the following summer or storage withdrawals will be unavailable during succeeding winters. Thus storage and SNG are by no means mutually exclusive sources of supply, but rather complement each other. For PEG to imply that this storage from Consolidated somehow reduces the need of Algonquin's customers for SNG is wholly without foundation.

It is entirely evident that the "questions" raised by PEG concerning Algonquin's SNG production are based upon misstatements or omissions of fact, and merit no attention. With respect to Algonquin's SNG, iti s altogether clear that the President's conclusions as to the importance of SNG are directly in point, and that SNG deliveries from Algonquin during the past winter were indispensable to the maintenance of service to residential customers.

SNG AND THE GAS DISTRIBUTING INDUSTRY

THE NEED FOR SNG

Gas distributors turned to synthetic natural gas (SNG—used herein to mean synthetic pipeline-quality gas derived from petroleum product feedstocks) at the time, some ten years ago, when it began to appear that domestic, and even imported, natural gas would not meet the nation's gas requirements. The process now generally used was perfected in Great Britain some years ago and provided a thoroughly tested means of making substitute gas. There was always a substantial price differential (even before the OPEC-connected increase in the cost of feedstocks, some three and one-half years ago), so that it was always clear that this product was a supplement to rather than a substitute for domestic natural gas.

The best evidence of the current need for SNG is contained in the Supply/Demand report published by Associated Gas Distributors.[1] In summary, this report shows that the likely supply of natural gas will fall short of the demand for this energy source even though this demand will be restrained by the higher prices which are likely to prevail with the ensuing years. This report, relying on econometric studies of demand elasticity, shows that 1980, 1985, and 1990 for the East Coast alone—which is the area of particular interest to Associated Gas Distributors—will need 40, 200, and 500 Bcf of gas respectively in each of those years to balance demand at the new higher prices.

There are various ways in which these gas utility companies—which take seriously their responsibilities to their customers to meet reasonable demands—can meet these potential deficits. Distributors are proceeding with attempts to import liquefied natural gas, and are vitally interested in the importation of gas from the Arctic regions (but can do little until major national and international issues are settled). They are also encouraging and indeed assisting to finance exploration in frontier areas such as the Atlantic Offshore. The AGD Supply/Demand report shows how these potential deficits could be met by those various other potential supplements. The important thing to keep in mind, however, is that all of these potential supply supplements must be characterized as problematical; and for responsible utilities there is a great need to obtain additional supplies of an assured nature which can be brought on line in a timely fashion. The Supply/Demand report shows that these companies cannot wait until 1985 for some hoped-for increase which may result from some offshore exploration, or from Arctic imports, or from LNG, or from places such as Siberia. This then is the basic rationale for individual gas utility companies, or groups of companies, to seek to plan for the accession of supplies of SNG. This search is now frustrated by current FEA restrictions—even though this supply is the only supply which can bring balance in the early 1980's.

[1] 1977 East Coast Natural Gas Supply/Demand Outlook Through 1990 (May, 1977). This report, which provides the supporting data and details for the conclusions drawn herein, is being furnished under separate cover to Chairman Jackson and the Committee staff.

THE DEMAND FOR GAS

Because the Petrochemical Energy Group (PEG) unfortunately appears to confuse the overall demand for gas with the use of SNG in industry (in an incomprehensible, confused fashion), it is necessary to discuss the nature of the gas demand included in the above-stated balance. On the East Coast (certainly the locus of the prime need for SNG) gas is used primarily for the so-called high-priority uses—residential, commercial, and those types of industrial cases where another fuel cannot very well be substituted for gas supply and even the substitutes are unavailable without rebuilding the industrial plants in question (and even here there are some uses of gas for which there is no ready substitute). Because of the recent shortages, other demands for gas (such as boiler fuel use) and other low-priority uses, have been severely reduced and are expected to be further reduced in future years. Current legislation will of course assist in this process. We point out, however, that the tapering off of demand of a relatively low-priority nature must be a gradual process. Even the Carter Administration legislation now before the Congress recognizes that this is a decade-long process if severe disruption to industrial plants is to be avoided. It is during this time period (the next decade) that SNG is particularly critically needed. Moreover, as the phase-down of low-priority gas uses proceeds, so, unfortunately, the supply of domestic natural gas is likely to be reduced, so that in the latter years of the decade of the 1980's, low-priority use will decline in step with natural gas availability, leaving high-priority use no better off. PEG ignores the recent forecasts for energy use accompanying the Carter Administration's proposed National Energy Plan. These forecasts anticipate a turn down in natural gas supply and an increase in high-priority use (as well as a gradual decrease in industrial use) with the balance in the 1980's required to be made up in some measure at least by supplemental gas supplies.

THE NATURE OF DISTRIBUTORS' SNG USE

PEG's rather simplistic allegations that SNG has been used to supply low-priority uses reflect a rather total ignorance of the operations of gas utilities and how SNG fits into this process. The supplies of a typical large gas distributing company are made up of (1) interstate pipeline supplies provided on a year-round contractual basis, (2) storage supplies for which the companies contract with pipeline companies or with their own affiliates, where the gas is received in the summer and redelivered for winter use, (3) the product of their own exploration and development efforts, transported to the consuming areas, (4) in some cases, by-product gas purchased from refineries, (5) SNG, (6) liquefied natural gas and (7) propane, which is stored for use on the very coldest days of the winter.

The cost of supplemental supplies is such that it is uneconomical to use them except for peak shaving and in peak winter demand periods. Gas usage is extremely temperature-sensitive. Swings of up to ten-fold between summer and winter cold day demands are not uncommon—and require the most careful allocation of each of a distributor's sources of supply to different days, depending on the expected demand. Moreover, the uncertainties of the weather of course, make it highly unlikely that the best-made forecasts will exactly work out on a given day or even a given month as planned. A utility is bound to attempt to utilize its supplies economically for the customers' benefit; while at the same time not exposing these customers to risks that storage supplies will be exhausted before the winter is over—this requires a careful scheduling balance. Under such circumstances a given amount of SNG may be manufactured on a given day (and these plants cannot be turned on and off at will) to supply the combined load of the gas utility, when with hindsight it might not have been desirable to run the SNG plant that week. Consequently, it is possible to state, as PEG does, that some SNG may have been physically used (as part of total supply) by low-priority industrial customers on any given day.

Furthermore, it must also be noted that the feedstock supply contracts of the utilities often have a take-or-pay-for clause which requires the use of this product (once storage has been filled) to avoid severe economic penalties. What should be obvious is that no competent utility manager will plan to manufacture relatively expensive SNG on any given day or period for sale to low

priority customers. However, as part of a seasonal supply, necessary for high-priority use, and to make supplies available in the peak periods at a lower cost than propane,[2] SNG is of course economically justified.

ALTERNATIVES TO THE ENCOURAGEMENT OF SUPPLEMENTAL GAS SUPPLIES

What is all too often ignored, in discussing the desirability of supplemental gas supplies, are the alternatives which the Nation faces if a gas-restrictive policy is to be followed. AGD's Supply/Demand report details the likely effect of such a course. Suffice it to say that consumers unable to secure gas because of a gas-restrictive policy must have some fuel substitute (else all growth would be stopped). For high-priority uses there are essentially two such substitutes in the time frame we are considering—electricity and number 2 fuel oil—in varying proportions depending on the use, with the latter perhaps somewhat outweighing the former. The use of these fuels (1) will increase the cost to the consumer very considerably, (2) will increase imports of oil for direct use (and even for electric enhancement, since we may expect the nuclear and coal additions to generating capacity to lag behind the demand for electricity even without the gas substitute increment) and (3) may further strain electric capacity as plant construction programs lag. Moreover, the gas distribution system is already in place, while (1) the electric system requires reinforcement and (2) oil distribution increases (by truck) will simply overcrowd already crowded city streets.

Moreover, the efficiency of utilization, from source to burner tip, will suffer if gas is not used.[3] This is particularly the case with electricity, when one considers the conversion losses from raw material to electricity at the customer's meters—gas, including SNG manufacture, is easily the more fuel efficient alternative.

In sum, there can be no question that the gas-restrictive course, by requiring recourse to more costly alternatives, imposes greater expense on the consumer, may well involve greater dependence on imports, is less fuel efficient and, of course, is less environmentally attractive.

THE FEEDSTOCK SUPPLY PROBLEM

The basis for any allocation program must of course be a shortage of the product to be allocated.[4] Naphtha is of course a product of refining crude oil. Its overwhelmingly important use is as a step in the production of gasoline—some 80 percent of naphtha is used for this purpose. The supply volume is determined then by the refinery construction program, largely geared to gasoline demand. FEA data indicate no near-term shortage of naphtha and the longer term prospects will be governed by the future refinery modification program, which in turn will be shaped by demand forecasts. If the PEG group registers its future needs with the oil companies, this will be a factor in shaping this program.

Utility use of naphtha is now less than 2 percent of total naphtha demand.[5] Were allocation restrictions for such use to be abandoned, it could of course be expected to increase (though nowhere near to the wildly inflated estimates used by the PEG group). For the Nation we estimate a less than doubling of SNG supply (though the increase would be modestly greater for the East Coast). There are no indications that this increase in naphtha supply, small in comparison with total naphtha demand, cannot readily be met as refinery capacity is increased.

While the above analysis indicates that allocations are not now and do not promise to be necessary, rendering moot the question of "who needs naphtha most", a word might be devoted to the subject. Each of the three uses of naphtha above discussed has its "high priority" and "low priority" elements. This obviously applies to gasoline. It also applies to petrochemicals. Some products made from the petrochemical building blocks are highly essential to the Nation (though there are natural substitutes)[6] and some totally inconsequential. Comparisons are

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[2] SNG has the advantage over the propane-air mix in that it is interchangeable with natural gas, in contrast to propane which can only be burned as a minor fraction of the supply mix.

[3] Contra to the PEG allegation in Appendix B of its presentation, which ignores the substitution element here discussed.

[4] We will concern ourselves here largely with the question of naphtha supply. LPS's are in limited supply, with the decline in natural gas production, and any substantial utility reliance on LPS's as an SNG feedstock may therefore involve increased imports. A great expansion in world LPG supply is forecast for the 1980's but this is only a forecast, and naphtha is therefore the key element.

[5] See FEA's Draft Programmatic Environmental Impact Statement on the Allocation of Petroleum Feedstocks to Synthetic Natural Gas Plants, DES 77-4 (May, 1977), at D-12.

[6] As well as feedstock alternatives for petrochemical plants.

invidious, but the high proportion of SNG going to high priority gas uses (which uses are indeed the rationale for SNG plant construction) leaves the gas use of naphtha in at least as favorable a priority position as any of the other major users. The discrimination practices against this use heretofore have clearly no logical basis.

CONCLUSION

It is clear that (1) the gas distributing industry has a vital need for SNG supplies, for high priority use, in the immediate future; (2) that the alternatives of increased oil and electric use are costly; and (3) that naphtha supply is not a problem, thus removing the rationale for allocation and making moot any "relative need" discussion (as to which in any event, gas usage does not suffer by comparison).

STATEMENT OF DR. FRED SCHULMAN, ENERGY CONSULTANT, SILVER SPRING, MD.

I. INTRODUCTION

It is difficult to believe that the Administration is really serious about the energy crisis. The National Energy Plan continues to: (a), subsidize OPEC oil imports to the tune of $17.6 billion (ref 1) while denying similar tax incentives for domestic oil production; (b), institutionalizes high inflationary OPEC oil prices through the well-head tax; and (c), fails to utilize the tremendous productive and trading capabilities of the United States that could well be used to negotiate American access to OPEC oil at reasonable economic prices which would make possible the decontrol of energy prices without undue inflationary pressures.

II. FOREIGN TAX CREDITS

According to a recent Treasury estimate (1), foreign tax credits amounted to $3 billion in 1972; 5.2 billion in 1973; 15.5 billion in 1974 and are estimated to increase to about $17.6 billion in 1977. It is important to recognize that domestic oil, Alaskan (2) and Canadian oil do not receive such tax subsidies. As a result, OPEC imports are maximized to the detriment of domestic, Alaskan and Canadian production; and high OPEC inflationary oil prices ripple through the economy with devastating effects on jobs and on social and foreign policy. Foreign tax credits for high-priced imported oil creates the framework for a low-growth economy frustrating upward mobility and employment objectives, causing tension and unrest among consumers, weakening friendly foreign countries and at the same time, rewards OPEC cartel members who have practiced economic warfare against the people of the United States.

Situations are encouraged in which non-tax credit oil is not aggressively sought as in recent Canadian and Alaskan developments. For example, Canada recently shut-in 25 percent of its oil production capacity (3), and has sharply reduced its exports to the United States (4). Also, as is well known, non-tax credit Alaskan oil has become surplus on the west coast. It was therefor proposed to divert Alaskan oil to Japan and replace this non-tax credit oil with an equivalent quantity of tax-credit OPEC oil. This would have generated an additional OPEC tax credit of about $3 billion at full Alaskan pipeline capacity.

It is clear that tax credits involve immense sums and their availability or non-availability may very well influence the extent and location of exploratory drilling. The tax credit thus has the paradoxical effect of REDUCING United States oil reserves since, historically, additions to new reserves parallels the degree of exploratory drilling activity Furthermore, the $17.6 billion tax loss to OPEC essentially wipes out the President's program to create new jobs, since more money is lost from the economy to OPEC than is injected into it by the jobs program. According to estimates (5), 3 million jobs and $75 billion of GNP which are now lost to OPEC nations could be restored by the economic stimulus provided by repeal of this unwarranted Internal Revenue Service tax subsidy to the wealthy OPEC nations.

III. EFFECTS OF TAX CREDITS ON DOMESTIC DRILLING

Obviously, foreign tax credits, given for purchase of OPEC oil exclusively, stimulates importation of OPEC and tends to discourage domestic oil exploration and production. In testimony on this subject before the Senate Finance Committee, Assistant Secretary of the Treasury for Tax Policy Frederic W. Hickman suggested reducing what seemed to the Treasury undue tax benefits which he said serves to increase incentives abroad (6).

In this connection, two facts are important and typical: First, foreign oil imports, estimated at $45 billion, are up 37 percent over last year (7), causing a "glut" in oil supplies (8) and causing an unnecessary huge foreign trade deficit estimated at about $25 billion for 1977. Second, exploratory oil well drilling in the United States remains at the low level of about 10,000 wells in 1977 (9) compared to 16,000 wells drilled in 1956 (10). The drastic decline in domestic oil drilling (and reserves) after the foreign oil tax credit was widely adopted in 1955 is vividly shown in figure 1. Surely we should drill more and therefor find more oil reserves within the United States. But where are incentives for increased domestic exploration and production? Under the present IRS ruling, we give $17.6 million in "buyback" tax credits exclusively for foreign oil. No wonder domestic production has declined. There is a lack of drilling in the United States, not a lack of oil reserves.

IV. CONTROL OF PRODUCTION

Brice Sachs of Exxon International is reported in Newsweek (8) as indicating that the output of the OPEC oil sheiks "are no longer easily controlled by the companies." A clear implication is that in order to prevent oil gluts, such as we have now, the companies must limit their domestic oil production which they can control more easily. For example, Shell Oil Company announced recently that due to inventory buildups of crude oil and gasoline, it would lower its crude oil purchasers from some suppliers but would not indicate which suppliers would be affected (11). Need to control Saudi oil output by the large oil companies is vividly seen in a cable sent during the 1973 oil embargo and nuclear alert crises from the president of ARAMCO to Standard Oil of California: "am convinced could tie up crude if deal was right. Saudis not really interested in big increased crude volume if we could fuzz up deal somehow;" (12). It is apparent to most observers that oil deals are well fuzzed to this day, with accurate data still an objective of the Administration's National Energy Plan.

Foreign tax credits have long been recognized as detrimental to domestic oil production as well as to the economy. Former Assistant Treasury Tax Legislative Counsel Stanford G. Ross told the Senate Subcommittee on Multinational Corporations that the tax laws are not neutral and that they are tipped in favor of foreign, not domestic investment (13). Mr. Ross said further that these tax preferences have adverse effects on our balance of payments and on domestic employment and investment. These predictions have been amply borne out during the last four years.

V. DISCUSSION

The Internal Revenue Service granted a tax credit for buying back OPEC oil in a private ruling issued about a year ago, reversing its previous decision denying such credits as unwarranted. This ruling has several pyramiding effects: First, it provides incentives for drilling and producing oil abroad at the expense of domestic exploration. Second, it encourages OPEC to maintain very high oil prices which are badly strangling United States and world economies, as pointed out recently by Rep. Moss and Richard J. Whalen (14, 15). Third, it results in excessive income to OPEC estimated to exceed $130 billion a year, which insulates OPEC from countermeasures, permits the cartel to reduce production instead of prices, allows OPEC to violate its agreements, and above all gives OPEC unprecedented political and economic power to influence the policies of other nations (16). Fourth, in open opposition to U.S. nuclear proliferation policy, it causes friendly nations like Japan, West Germany and France to emphasize nuclear power development and exports in order to help earn the money needed to pay for high-priced oil imports (17).

Professor M. A. Adelman (18) pointed out earlier this year to the Joint Economic Subcommittee on Energy that the OPEC cartel is an economic burden to the world and that the more we can reduce cartel revenues, the better for us. Repeal of the I.R.S. ruling on OPEC oil buyback tax credits would do just that to the tune of about $17.6 billion per year.

With respect to U.S. oil corporations favoring OPEC imports over domestic production, consider the following: U.S. producers buy oil from the Arab OPEC governments at prices and in amounts set by the host governments. It is clear that all crude lifted by the companies for the host governments must be marketed by the concession operator, usually ARAMCO, and sold to its shareholders Exxon, Mobil, Standard of California and Texaco. Each company has large domestic oil production in addition to its foreign operations. Since these companies are required to maintain host government-set production levels, it follows that imports will be maximized in order to market the prescribed levels of foreign

production. To avoid market gluts from forcing down prices, domestic production will be normally assigned the important swing role of balancing total production to market demand so as to maintain oil price and supply stability. The exclusive I.R.S. foreign oil tax credit encourages this practice. It is important that despite huge foreign oil imports this year, the oil companies have notified crude oil producers that they will reduce their purchase of domestic crude by more than 100,000 bbls per day (19).

The Wall Street Journal, in a perceptive editorial last November (20), noted that some of the international companies have committed themselves to further exploration in the OPEC countries and asked the following questions: "Has any of them also agreed to LIMIT ITS EXPLORATION elsewhere as part of the bargain? How far have they gone in promising to run their oil refineries in the OPEC countries, rather than in Europe or the United States? Are any commitments being made regarding the companies' behavior in future economic warfare, like the 1973–74 Arab embargo against this country and Holland?" The answers to such questions are vital.

VI. CONCLUSIONS

Present tax policy of the I.R.S. regarding foreign oil production is leading to important consequences in the foreign affairs and economic spheres (21). As a result of oil sales at prices $13 to $13.50 per barrel, OPEC has been amassing more than $130 billion per year in revenues compared to about $7 billion in 1970. Its short-term assets on deposit in U.S. banks exceed $25 billion making the banks virtual hostages to Arab policy (22). Another $11 to $12 billion has been directly invested in American real estate and industry (23). If nothing effective is done to reduce imports, the U.S. oil import bill during the next fourteen years ending in 1990 may top $1,500 billion (24). Serious domestic and international problems are sure to occur if the estimate proves anywhere near correct. The current I.R.S. ruling supports the OPEC cartel and hurts the domestic oil industry. It mocks and makes ineffective the goals of the National Energy Plan.

VII. RECOMMENDATION

Reversal and repeal of the I.R.S. ruling favoring overseas oil production over domestic oil production is a necessary first step toward energy and economic health.

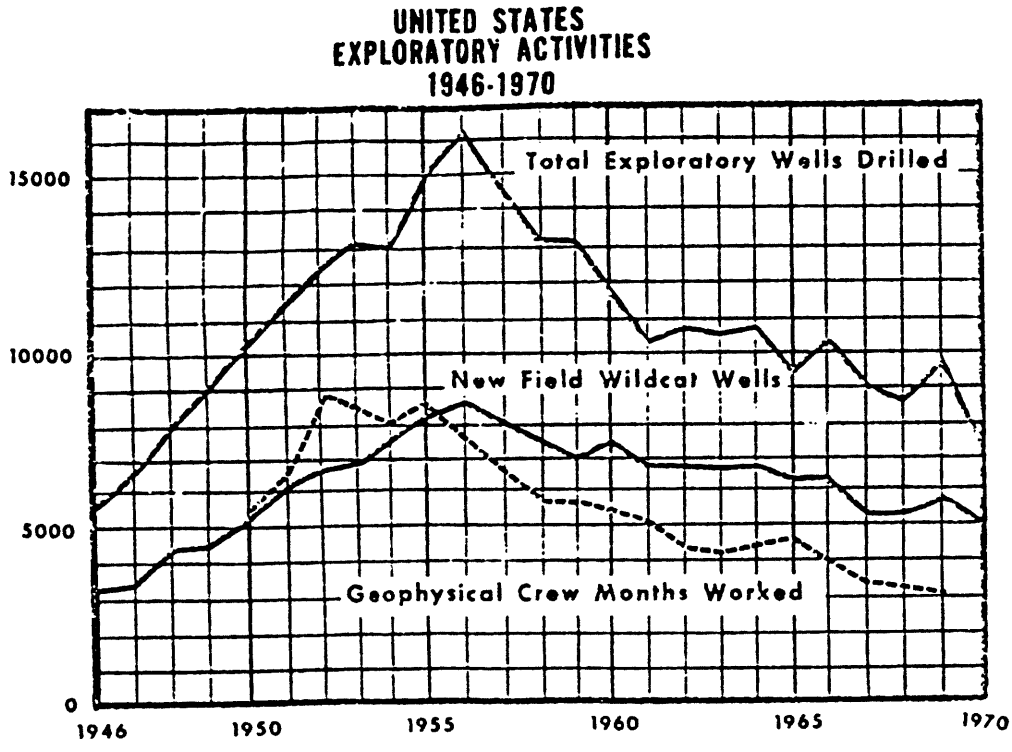

FIGURE 1

Source: Senate staff study, 1973.

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STATEMENT OF OWENS-ILLINOIS, INC.

Owens-Illinois is one of the world's leading and most diversified manufacturers of packaging materials in glass, plastic, and paper. Additionally, Owens-Illinois manufactures an array of consumer and technical products. In the United States Owens-Illinois employs 51,000 individuals in more than 100 manufacturing and related facilities. Internationally, Owens-Illinois has world-wide operations employing an additional 32,000 persons.

Owens-Illinois has outstanding research and development capabilities in high technology areas. Specifically, Owens-Illinois glass technology has resulted in a remarkable new solar collector, which uses an array of specially designed glass tubes, a high vacuum and selective coatings to convert sunlight into useful heat energy. The glass-based advanced collector can operate efficiently under severe environmental conditions. Currently, the Owens-Illinois solar collector is in operation at 14 installations in the United States and Canada as part of its ongoing development program.

As a manufacturer of solar collection equipment, Owens-Illinois supports the proposition that tax incentives be provided for purchasers of solar energy equipment.

The National Energy Act (H.R. 8444) as passed by the House includes a number of provisions designed to encourage the development of solar energy

technology and the utilization of solar energy equipment. Indeed, this legislatin explicitly recognizes as a national imperative the need for the United States to develop "renewable and essentially inexhaustible energy sources to insure sustained long term economic growth."[1] Solar energy is the most promising "renewable and essentially inexhaustible" energy source.

We believe that comprehensive steps should be taken at once to accelerate the rate of growth of solar technology and the rate of production of economical solar energy equipment. The National Energy Act contains important, but inadequate, steps in this direction. The Act's incentives for solar energy could be made much more effective by:

(1) providing a three-year tax life for business purchasers of solar energy equipment, while maintaining the full investment tax credit of 20 percent provided by H.R. 8444; and

(2) providing a program of incentives for manufacturers to develop solar technology and to invest in machinery and facilities for the production of solar energy equipment. Exhibit A covers incentives to manufacturers in greater detail.

By way of introduction, we view the energy crisis as real. The growing shortage of domestic gas and oil will worsen, and our balance of payments problem will preclude the indefinite substitution of increasingly expensive foreign imports. It is thus mandatory that we proceed to develop alternate sources of energy. Coal, nuclear, and solar seem to offer the most potential in the near future, but research on other sources should also be continued in the likely event that we will ultimately need all or most of them. Our particular interest is in solar technology and our studies have led us to conclude that effective incentives for solar energy can make a significant impact on the establishment of a visible solar industry.

Solar energy has many attractive aspects. It is plentiful, inexhaustible, clean, non-polluting, and environmentally responsible. Why then have we not put it to more use in the past? It has simply been less costly to burn fossil fuels. It still is, but this is beginning to change. We now can predict with some confidence that solar energy will be competitive with fossile fuel energy for many applications within a decade.

In order for solar energy to become a viable alternate energy source it must become economically competitive with other forms of energy. During the transition period before equal costs are realized, the Congress can help equalize costs to the user by providing appropriate incentives. To do so, you must have confidence that such incentives will be successful within a reasonable time frame.

TECHNOLOGICAL READINESS

The readiness of solar energy systems for general use depends on the application. The primary initial applications of solar energy are those which provide heat up to 250° F. Most ready are those systems designed for hot water, heating, cooling, and industrial process water and steam. Solar geothermal and photovoltaic are further from practicality. Together, the primary applications comprise a large portion of our total national energy needs. If solar energy supplies only a modest fraction of these needs, it will become a large industry in its own right.

Today it is possible to produce solar collectors which can achieve average collector efficiencies of about 60 percent over most operating ranges of interest and in most climates and weather conditions. This is accomplished by providing a vacuum thermal barrier between the hot collector surface and the ambient air. Figure 1 compares the performance of evacuated collectors with the more conventional flat plate collectors. Manufacturing costs of the higher performance systems are expected to be comparable to or less than conventional flat plate systems under volume production because they are lighter and because they use low cost, readily available materials.

A modern installation of a 7,000 sq. ft. evacuated tubular collector on a GSA office building in Saginaw, Michigan, has recently been completed and is shown in Figure 2. This collector was manufactured by Owens-Illinois and is designed to provide for hot water, heating and cooling of the building. We expect this extreme northern climate to be a severe test for solar energy, and Owens-Illinois is proud to be part of this demonstration. During the coming year, we will learn a great deal from installations such as this one to help refine both the equipment and the manufacturing techniques.

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[1] The National Energy Plan, Executive Office of the President, Energy Policy and Planning, April 29, 1977.

FIGURE 1

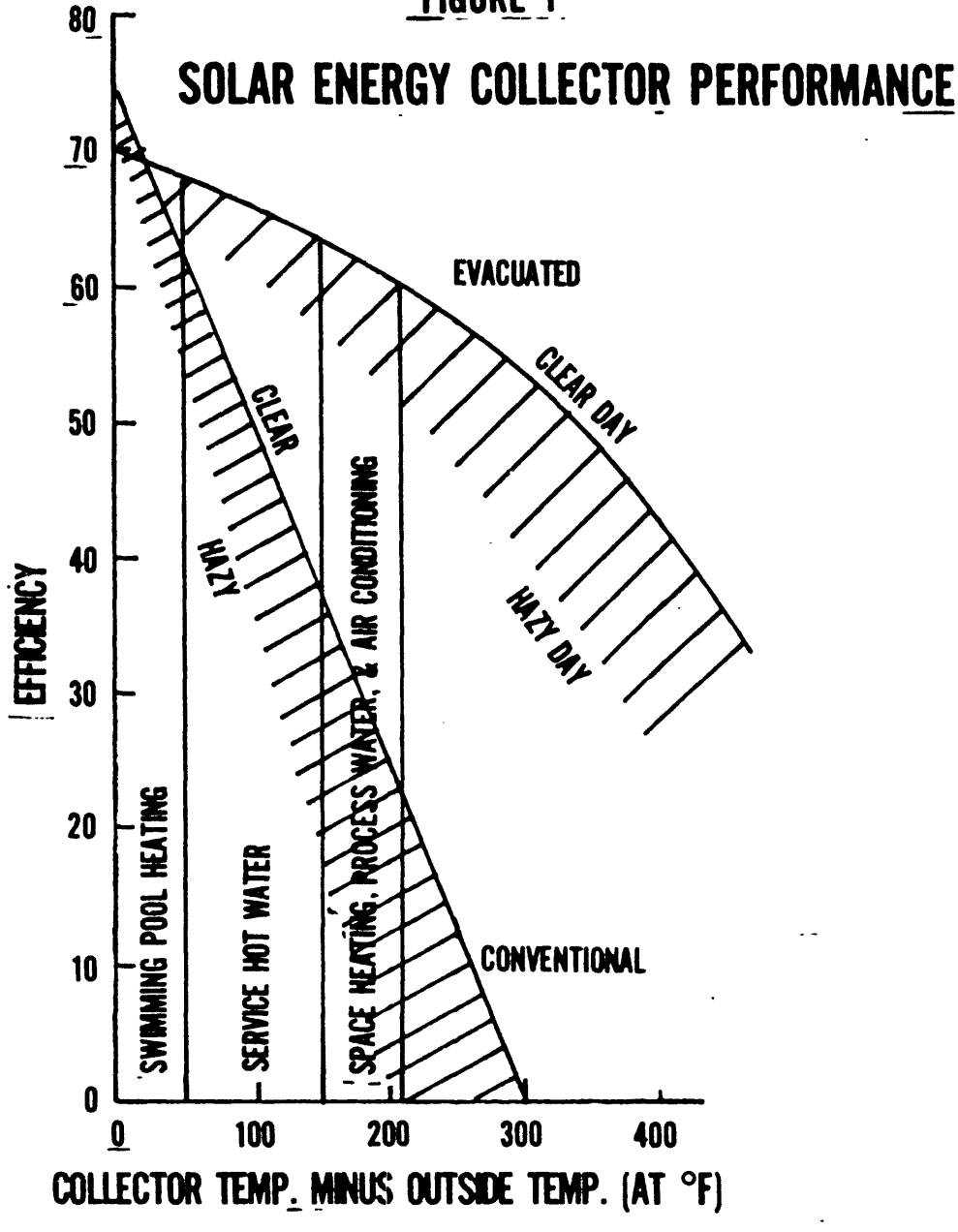
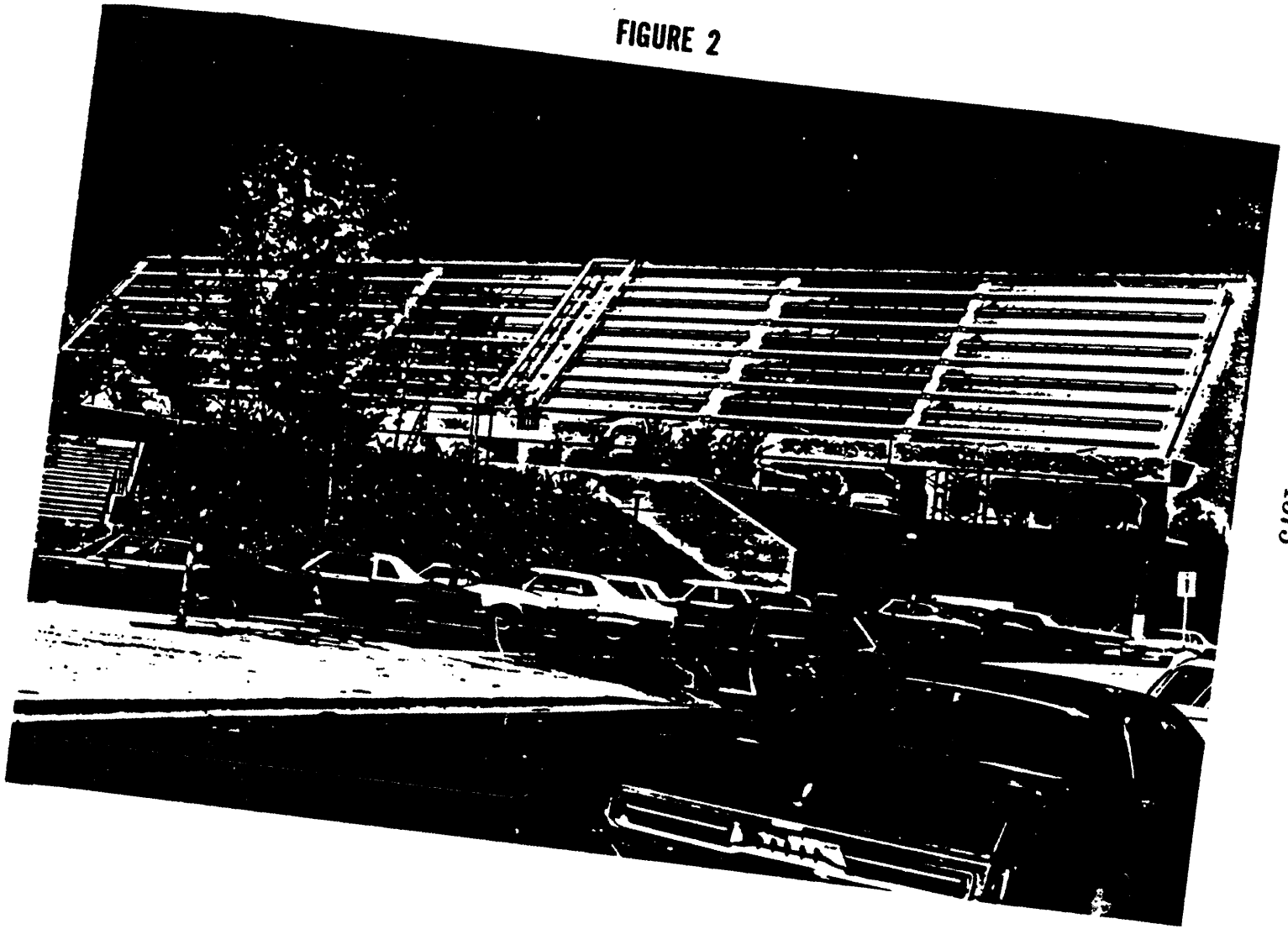

SOLAR ENERGY COLLECTOR PERFORMANCE
EFFICIENCY
80
70
60
50
40
30
20
10
0
EVACUATED
CLEAR DAY
HAZY DAY
CLEAR
HAZY
CONVENTIONAL
SWIMMING POOL HEATING
SERVICE HOT WATER
SPACE HEATING, PROCESS WATER, & AIR CONDITIONING
0
100
200
300
400
COLLECTOR TEMP. MINUS OUTSIDE TEMP. (AT °F)

FIGURE 2



ECONOMIC READINESS

Even with the efficiencies of evacuated collectors, solar energy is not yet ready to compete with oil on a head to head basis without incentives. As shown in Figure 3, in order to compete with 50 cents/gallon oil for business use, it would be necessary to install the entire solar system for less than $22/sq. ft. in Denver, a relatively good location. Today's costs are more than twice that figure for all but the simplest solar installations. Note, however, that a system with evacuated tubular collectors could compete with 4 cents/KWH electricity (which is equivalent to a fuel oil price of $1/gallon). This is the case for solar hot water systems which are becoming competitive today.

There are many reasons why solar energy is relatively expensive. Not the least important reason is that existing Federal energy policy has heavily favored other energy sources by artificially keeping the price of fuels low. Substantial tax advantages have been provided for mining and drilling operations. Although some of these policies are now being revised, capital investment in drilling and mining operations will still be encouraged by the availability of the depletion allowance and the deduction for intangible drilling costs. These tax incentives are very effective. They reduce the risks of new investment and make more energy available at a lower cost to the consumer. Solar energy does not benefit from such implicit subsidies now enjoyed by most other energy sources, and the changes contained in the National Energy Act do not go far enough toward improving solar energy's position relative to other energy sources.

Solar equipment is also relatively expensive because the industry is so small and diffuse. Despite impressive recent increases in the market for solar equipment, less than one thousandth of one percent of our total energy requirements are now being supplied by the combined average output of all solar collectors presently installed in the United States.[2]

SOLAR ENERGY INCENTIVES IN THE HOUSE BILL

Both the Administration's proposals in its National Energy Plan and the provisions of the National Energy Act as passed by the House are designed in part to stimulate the market for solar energy products. This would be accomplished primarily by reducing the costs to business and residential customers through tax credits for solar and wind energy equipment and a special investment tax credit in addition to the regular investment tax credit for certain business energy property. The federal government solar energy initiatives contained in the Act will also contribute to the development of an early volume market for the emerging solar industry. Solar energy would also benefit indirectly from provisions of the bill which would raise the price of oil and natural gas.

Energy property eligible for the special investment credit under the Act include equipment which uses solar energy to provide heat, cooling, or electricity in connection with an existing industrial or commercial building or industrial process. Both the residential credit and the business special investment credit would accelerate the development of solar technology as a significant source of energy by reducing the net cost of purchasing solar equipment.

There is no doubt that the solar industry is growing. Without any Federal incentives the industry would most likely continue to grow over time, but not at the desired rates. As the OTA Report makes clear, the nation's energy policy is not neutral toward solar technology. However, as long as greater incentives are provided for investment in producing other forms of energy, solar technology will develop more slowly. Fortunately, the National Energy Act does move in the direction of equalizing incentives for solar technology with incentives already provided for producing other forms of energy, but it does not contain as effective or as fully balanced a program of incentives as those provided for non-renewable energy sources or as our present goals require.

The revenue estimates for the House-passed bill demonstrate that the business solar tax credit, for example, is not expected to have much of an impact. The tax cost for the business solar credit would be less than $5 million during any year it is available. This upper limit of total incentive dollars needs to be compared to the amount of incentive dollars which support non-renewable energy sources.

It is extremely desirable that the incentives for business to invest in solar systems create parity with individual homeowners or tax-exempt institutions.

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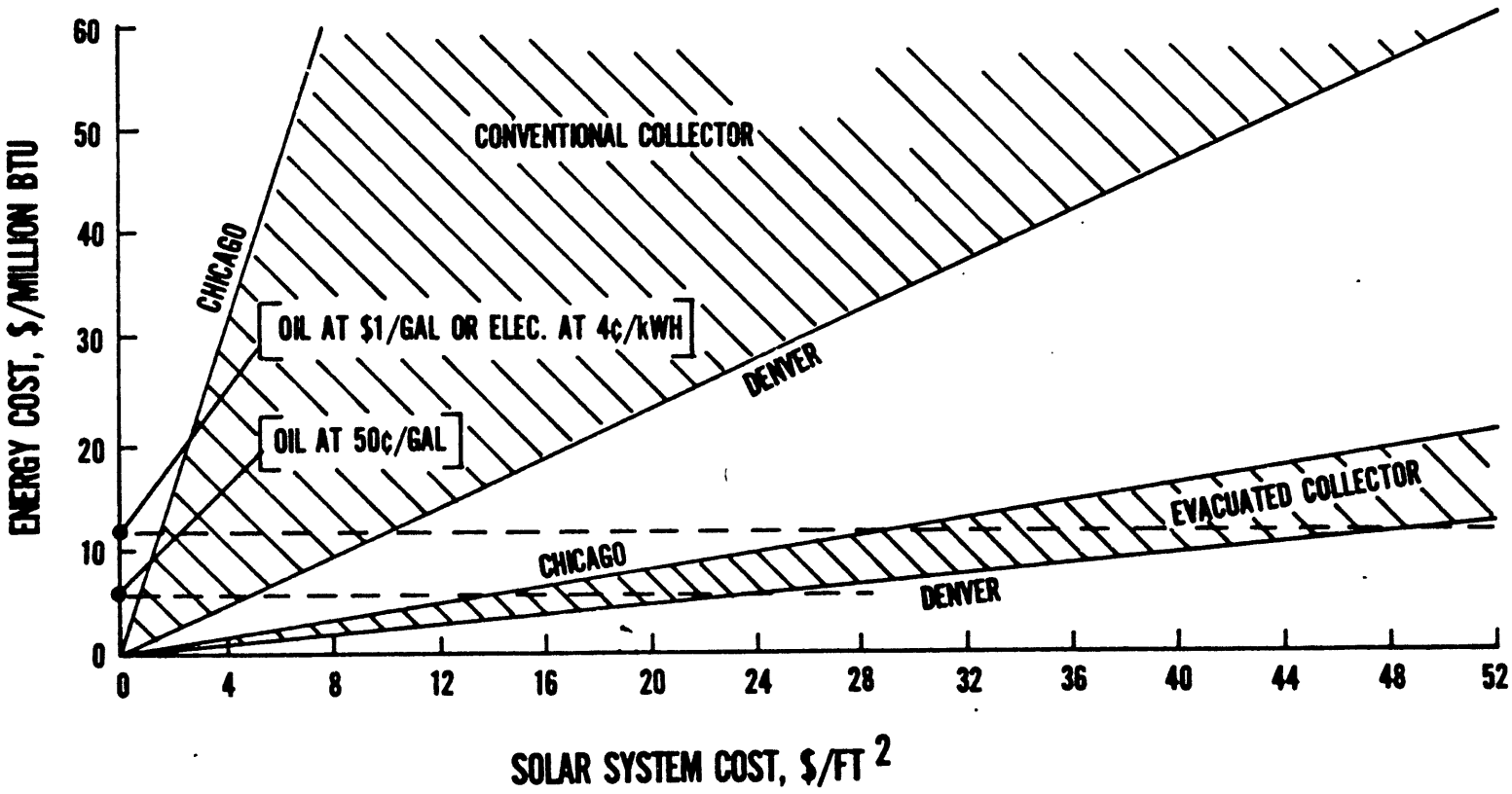
[2] Application of Solar Technology to Today's Energy Needs (Prepublication Draft, Office of Technology Assessment, June 1977, hereafter "OTA Report"), I–4.

FIGURE 3

COMPARISON OF SOLAR ENERGY COSTS



Industrial applications tend to be very large and a large volume of solar collectors can be sold, installed and serviced in the field more conveniently. Industrial sites are more apt to be well engineered. Industrial users are very cost-conscious and sites are more likely to be well monitored. Industry also generally requires more versatile and advanced equipment which will accelerate the development of solar energy technology. They are also better able to screen out the low quality equipment which is finding its way into the market. In short, incentives to facilitate industrial applications of solar energy will advance the day when we can all enjoy it.

How much will a solar system cost the end-consumer? We believe that collector modules using evacuated tubes can eventually be manufactured and sold at the plant for $5 to $10/square foot. Mark-ups through the trade channels of the heating, ventillating, and air conditioning (HVAC) industry and the addition of other system components will raise the incremental price to $25/square foot for simple hot water systems and to $50/square foot for more sophisticated heating and air conditioning systems.

The incremental price of a solar system is the total price of the solar system less the price of a conventional system. It is this increment or premium which must be justified by savings of conventional fuels. The incremental price of $25–$50/square foot assumes mass production of all components, established distribution channels, and standardized installation procedures; it is expressed in 1977 dollars. In short, it assumes a well established solar industry.

This leads us to the issue of what consumers can justify paying for their solar

FIGURE 4
JUSTIFIABLE INCREMENTAL PRICE ($/SQ. FT.)

Solar System Vs. Fuel Oil System

Location Of Buyer	Type Of Buyer		
	Institution	Homeowner	Business
DALLAS	$34.80	$29.10	$13.50
WASHINGTON, D. C.	$25.90	$21.50	$10.10
DENVER	$25.10	$20.90	$9.80
BOSTON	$20.10	$16.70	$7.80

Solar System Vs. Resistance Electric System

Location Of Buyer	Type Of Buyer		
	Institution	Homeowner	Business
DALLAS	$94.40	$61.90	$25.20
WASHINGTON, D. C.	$80.30	$53.60	$25.60
DENVER	$68.80	$46.60	$18.60
BOSTON	$70.60	$45.70	$21.30

system installation. The answer depends on collector type, geographic location, and type of fuel being replaced. As shown in Figure 4, the justifiable incremental price for using solar energy increases by 70 percent due to geographical location (Boston vs. Dallas). An additional factor is the type of buyers. Because of tax structure and the relative cost of money, governmental entities and tax-exempt institutions can afford to pay more than homeowners, and both can justify higher costs than businesses. The spread in the justifiable incremental price due to the type of buyer is 160 percent.

Figure 4A tabulates the justifiable prices of solar energy systems both under present law and under H.R. 8444, as passed by the House (including oil price increases and business tax credits, but not the residential tax credits). The tax to increase the cost of oil at the wellhead raises the price premium which all potential buyers can justify paying by about 13 percent.

For example, a federal building in Dallas can justify $39.40/sq. ft. under H.R. 8444 vs. $34.80 without H.R. 8444. For the homeowner in Boston, it becomes $18.90 vs. $16.70. Because of the additional fuel use tax provisions of the bill, coupled with the tax credit incentives, businesses can justify paying almost an additional 50 percent premium for solar systems. For a factory in Dallas, it becomes $20.10/sq. ft. vs. $13.50. The bill does not address electric energy prices directly, but its ramifications on escalated fuel oil and natural gas costs will increase electric rates to all users. This will result in institutions and home-

FIGURE 4-A

JUSTIFIABLE INCREMENTAL PRICE ($/SQ. FT.)

Solar System Vs. Fuel Oil System

Location Of Buyer	Type Of Buyer					
	Institution		Homeowner		Business	
	A	B	A	B	A	B
DALLAS	$34.80	$39.40	$29.10	$32.90	$13.50	$20.10
WASHINGTON, D. C.	$25.90	$29.30	$21.50	$24.30	$10.10	$15.00
DENVER	$25.10	$28.40	$20.90	$23.60	$9.80	$14.60
BOSTON	$20.10	$22.70	$16.70	$18.90	$7.80	$11.60

Solar System Vs. Resistance Electric System

Location Of Buyer	Type Of Buyer					
	Institution		Homeowner		Business	
	A	B	A	B	A	B
DALLAS	$94.40	$103.80	$61.90	$68.10	$25.20	$30.80
WASHINGTON, D. C.	$80.30	$88.30	$53.60	$59.00	$25.60	$31.30
DENVER	$68.80	$75.70	$46.60	$51.30	$18.60	$22.70
BOSTON	$70.60	$77.70	$45.70	$50.30	$21.30	$26.00

A= Without National Energy Act (H. R. 8444)

B=With National Energy Act (H. R. 8444)

owners that use electric resistance heat being able to justify an additional 10 percent premium for solar systems. The additional tax credit contained in H.R. 8444 will result in businesses being able to justify an additional 22 percent premium for solar systems. Despite this legislation, businesses are still at a disadvantage by comparison to other buyers. Stronger positive incentives are needed to induce the broad use of solar energy by industry.

Dramatically, the business that wishes to use solar energy can justify paying less than half the price a homeowner or an institution can pay even under the provisions of H.R. 8444. This occurs because the solar energy system is a capital investment which must be financed in the conventional manner and depreciated over a relatively long period of time. The cost of conventional fuel, however, is a normal operating expense which is deducted from gross income on an annual basis.

MORE INCENTIVES ARE NEEDED

These disparities between what the user can afford to pay for solar energy and what good systems cost today brings us to the need for additional incentives. The most effective additional incentives are reduced tax lives and low interest loans. These incentives are crucial to the early development of solar energy and should be supported. More than anything else, we manufacturers of solar equipment need a market to justify the capital investments required to reduce costs. Energy legislation should diminish the disparity between incentives now offered to non-renewable energy sources such as oil and natural gas and those offered to renewable energy sources such as solar.

A balanced and comprehensive program of solar technology incentives should include a three-year tax life for business purchasers of solar energy equipment. A three-year tax life would increase by $6.30/square foot the price a business in Dallas would able to justify for a solar energy system to $26.40/square foot.

If business could borrow money at a 5 to 6 percent interest rate instead of 8 to 9 percent to finance solar systems the justifiable price would be further increased by approximately $7.000 per square foot. Providing government subsidized loans to both purchasers and manufacturers of solar energy equipment would stimulate the emerging solar energy industry.

The provisions of the House bill promoting the use of solar energy systems for government funded buildings are important and should be encouraged. As demonstrated in Fig. 4A, institutions (such as the federal government) are still closer to justifying solar systems than any other type of buyer. Incentives to institutions, and specifically for government buildings, can be of great importance in establishing an early volume market for the emerging solar industry. And as described in Exhibit A, the program of additional incentives for manufacturers of solar equipment would also be helpful.

CONCLUSION

Specifically, we are recommending the following (Figure 5):

1. That tax incentives provided by H.R. 8444 for purchasers of solar energy equipment be retained and improved.
2. That a three year tax life be allowed for business purchasers of solar energy equipment, while maintaining the full 20 percent investment tax credit for solar energy equipment contained in H.R. 8444.
3. That manufacturers of solar energy equipment be allowed, essentially the same incentives for their production facilities, specifically, a 20 percent investment tax credit and a three-year tax life.

Solar energy can play an important role in the future energy supply of the United States. The incentives provided in H.R. 8444, as passed by the House, are necessary. Timing of the growth of the solar industry can be speeded by additional incentives for large industrial installations and by incentives for the construction of solar equipment plants.

The benefits of the resulting increased capital investment in the solar industry in the next few years are likely to pay for themselves in terms of an increased gross national product, reduced energy imports, more favorable balance of payments, and increased employment. In addition, it would give the U.S. a firm base for industry to grow on its own, once solar energy becomes economically competitive with conventional fuels, and it would enhance the position of the United States as a world leader in solar technology.

FIGURE 5.—Conclusions

Solar can play an important role in future energy supply.
Existing incentives are necessary.
Additional incentives are required—
- for business installations: 3-year tax life while maintaining 20-percent tax credit.
- for solar manufacturers: 3-year tax life and 20-percent tax credit.

EXHIBIT A

TAX INCENTIVES FOR THE DEVELOPMENT AND MANUFACTURE OF SOLAR ENERGY EQUIPMENT

Owens-Illinois as a manufacturer of glass components of solar energy equipment supports the proposition that tax incentives be provided for purchasers of solar equipment. The company also supports a proposal for direct tax incentives for manufacturers, in addition to purchasers tax incentives—and not in lieu of them. Manufacturers should be encouraged to expand production of solar energy equipment or to reduce the cost of manufacturing such equipment. The addition of tax incentives for manufacturers would strengthen the program to develop a larger solar market.

While the National Energy Act (H.R. 8444) does contain tax incentives for the purchase of solar energy equipment, it does not contain any direct tax incentives for the manufacture of such equipment.

The Carter energy plan also contains two incentives, both outside of the tax area, for the development of solar energy equipment. Under one provision of the program, the federal government would spend more money for research and development of solar energy equipment. These expenditures will be in the form of research and development grants or other payments to individuals and companies (see p. 79 of The National Energy Plan). Also, the energy bill contains provisions under which the federal government would contract with firms for the installation of solar energy equipment in new or existing government buildings (§ 741 et seq.). In addition, a temporary public education program is proposed.

The Act should include a three-year tax life provision for any facility, including land, machinery and equipment, which is constructed, installed or acquired by a taxpayer and used for the production of solar energy equipment. It should also include a special additional investment tax credit for all expenditures for machinery and equipment used to manufacture solar energy equipment.

A three-year tax life for solar manufacturing facilities should be permitted pursuant to guidelines issued by the government. As an alternative to an across the board provision, this would permit some quality control and greater coordination with other federal programs.

In addition, an increased investment tax credit could be provided for expenditures for machinery used for the production of solar energy equipment. The solar credit could be made incremental, as the recycling credit in the House-passed bill, and only allowed for new investment or investment which increases existing production capacity. The OTA Report, III-A-27, has shown that a 20 percent investment credit would have a significant impact on the cost of solar energy using life-cycle accounting as compared to other energy sources in a relatively few years. A 20 percent tax credit for incremental investment in solar manufacturing facilities over the next five years would be fully justified. This would greatly increase productive capacity and generally improve the economy.

These measures would substantially strengthen the National Energy Act at a relatively low revenue cost. They are consistent with the national commitment to develop renewable and essentially inexhaustible sources of energy for sustained economic growth. And they are essential if solar technology is to make a significant contribution toward meeting the nation's energy requirements over the next decade.

All of the business energy tax credits contained in the National Energy Act, including the recycling credit, are available to taxpayers only through 1982. To the extent that such incentives increase manufacturers' production or recycling capacity, the benefits of the incentives will continue to accrue long after the expiration of the credit. It is important to maximize the long term benefit of such

incentives by encouraging not merely an immediate increase in production, but an increase in production capacity. This will require greater incentives to business users of solar energy as well as direct manufacturers' incentives.

Because solar energy provides conservation of non-renewable fuels, is nonpolluting, and is environmentally responsible, a 3 year tax life is totally justifiable. There is precedent in prior and current tax law for providing special tax incentives in times of national emergencies. Section 168 of the Code, which was repealed by the Tax Reform Act of 1976, provided reduced tax lives for facilities (plants and equipment) which were constructed for the purpose of producing designated emergency defense items.

This provision had its counterpart in World War II tax legislation and was reenacted during the Korean war of the 1950's. The provision was very effective in stimulating the desired activity in spite of some difficulties in the administration of the program. Reports received by the Joint Committee on Defense Production of Congress indicate that the accelerated tax amortization program (section 168) was particularly effective in enabling the government to meet its goal for the elimination of critical deficiencies by encouraging industry to expand supplies of strategic materials for defense production and stockpile acquisitions. From the beginning of the program through June 30, 1958, certificates of necessity issued to industry for accelerated tax life covered capital investments of $38.2 billion of which $23.1 billion was eligible for fast write-offs.[1]

TECHNOLOGY INTERNATIONAL, INC.,
San Francisco, Calif., September 13, 1977.

Mr. MICHAEL STERN,
Staff Director, Senate Finance Committee, Dirksen Senate Office Building, Washington, D.C.

DEAR MR. STERN: Our firm, Technology International is a geothermal energy development company attempting to stimulate large scale geothermal energy use as a replacement for oil and gas at six sites in four Western states. Two projects are located in Oregon, two are located in California and one each in Idaho and Utah. The projects range in size from an overall replacement of $230,000 per year of fuel oil for space heating to a mammoth project which could replace in excess of $200,000,000 per year of oil and gas for process heating and space heating uses. The Company also owns geothermal leases on properties which demonstrate a high potential for electrical energy production.

This correspondence to the Senate Finance Committee is sent with the hope that its members are interested enough in the near term development of alternative energy sources to support the tax inducements which are absolutely necessary to raise the capital needed to further develop and further refine exploration techniques associated with this intriguing, virtually nonpolluting alternative energy resource. This is not a small matter.

LOWEST COST NEW ENERGY

While only 30 geothermal wells were drilled in the country last year, this alternative energy source, given the right resource, user and transmission distance characteristics has been proven to provide the lowest cost form of new energy available in the United States today.

MUCH BROADER IMPACT

Work carried out by our firm satisfies us that, contrary to usual thinking, these resources can provide low cost process and space heating and cooling energy from a single site on a cost effective basis to areas comprising thousands of square miles. Geothermal energy has the capability, from a single site by movement through transmission pipelines to have a much greater impact upon the nation's energy supply than is generally recognized.

CO-GENERATION IMPACT

The development of pipeline systems as we propose would also have a positive impact upon the development of similar systems for large scale co-generation projects which would employ a similar technology.

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[1] Eighth annual report of the activities of the Joint Committee on Defense Production, S. Rept. No. 1, 86th Cong., 1st Sess., (January 9, 1959) page 83.

NOW BEING USED INTERNATIONALLY

This low cost, virtually nonpolluting, domestically controlled energy source which unlike solar for example, is currently being used in cost effective large systems in France, Iceland, Hungary, Italy, Mexico, New Zealand, and Japan and it requires only one thing to stimulate its near term domestic development by the "high technology" capabilities of United States industry. The one thing which is presently lacking in this industry in great amounts is money.

BETTER THAN COAL

Geothermal energy is, where economically available, a much better alternative than coal since it has proven in our studies to be much more cost effective and cost controllable over the long term. If handled properly geothermal is much less degrading to the environment.

LARGE SCALE POTENTIAL

Our firm maintains that with virtually no less of tax revenues, through a properly conceived investment incentive program the United States could stimulate the development of an industry which could deliver in excess of the stated geothermal energy objectives of the Energy Research and Development Administration.

INCENTIVES REQUIRED

Without the enactment of investment incentives at least equal to oil and gas, which enjoys a fifty year cycle of development and a high depletion rate for smaller production entities, the United States will not even meet the minimal geothermal objectives of ERDA. As a smaller entrepreneurial entity, we assure you that this is the case. This industry must have investment dollars in large amounts to meet its potential. We therefore urge the following action by the Senate Finance Committee and hope that should these proposals find favor that they would then be enacted into law:

PERCENTAGE DEPLETION ALLOWANCE

There is presently a conflict between the position of the Internal Revenue Service and the courts on whether geothermal steam and heated fluids qualifies for depletion treatment. The House of Representatives voted a 10 percent depletion allowance. We ask that the Senate Finance Committee recommend a 22 percent depletion allowance for all geothermal steam and hot earth fluids resources to specifically include hot water for process heat and space heating and cooling. This will help to stimulate both electrical and nonelectrical geothermal projects.

NOT TAX PREFERENCE ITEM

We additionally suggest that depletion not be considered a tax preference for purposes of minimum tax to encourage a maximum allocation of investment funds to geothermal energy development.

Alternative Energy Tax Credit.—We applaud this tax credit to give an additional 10 percent on top of the existing investment credit as an admirable incentive. However, we believe that the following observations would strengthen this incentive:

COVER NEW PLANT CONSTRUCTION ALSO

The credit as approved by the House appears to cover only facilities in existence by April 20, 1977. This does of course encourage "retrofit" of existing structures. But we believe that it should also cover new construction, say for a period of five years from the present. This would encourage the development of low cost, energy efficient virtually nonpolluting industrial parks as our company is proposing at several locations.

The legislation should make it clear that the credit is available to any user, irrespective of whether plant and equipment is employed in the user's trade or business. This is important because one potential source of financing is the large energy users themselves. The credits are needed to stimulate their investment in what are perceived as high financial projects.

COVER PIPELINES

Since a significant cost item are the transmission pipelines the legislation should definitely stipulate them under the proposed credit. We would hope that wells would also be covered under the credit since they comprise only one portion of the delivery system.

EXISTING RESIDENTIAL AND NEW CONSTRUCTION

While a tax credit is available for solar and wind expenditures for individual house owners, we note that no such consideration is allowed for geothermal. Since our firm is working on the development of geothermal energy heating and cooling systems for several American towns and cities we recognize the need for the extension of geothermal tax credits for individual residential users. We have two projects on which we are actively expending time and dollars both of which would be larger than the geothermal heating system in Reykjavik, Iceland which provides all heating needs for 90,000 persons.

ENDORSE 94TH CONGRESS PROPOSAL

With the kind of residential credits proposed by the Senate Finance Committee of the 94th Congress the nation would see lots of geothermally heated houses. The 94th Congress Committee proposed giving 40 percent of the first $4,000 of expenditure and 25 percent of the next $6,400 with a total maximum credit of $2,000. This would stimulate large scale energy and cost efficient systems. We heartily endorse this proposal.

CHANGE IRS CODE SECTION 465

The major argument for this change is that the whole "raison d'etre" for the Division of Geothermal Energy of ERDA is to stimulate the development of near term, large scale use of geothermal energy. The 68 million dollar budget of this division is directed to this mission. However, together with this "pump priming" by the Federal government there must be strong stimulation of the private sector or this very promising industry will become yet another lackadaisical benefactor on the public dole.

Specific Change of Section 465.—Not mentioned at all to date is revision to Internal Revenue Code Section 465. That should be clarified to confirm that geothermal resources are not included within the scope of "Oil and Gas resources" in Section 465(c)(1)(D). This would give the added incentive of a tax deduction on any borrowed funds spent in which the lender looks to an Energy Research and Development loan guaranty in the event of a non-payment. The public policy of encouraging geothermal development has given rise to the ERDA loan Guaranty program. This change is Section 465 would further promote this public policy.

EFFECT OF CHANGE

Since the purpose of the program is to stimulate development and since the tax loss to the government would be minimal it is perfectly consistent with the spirit of the program that loans should not be crippled by any "at risk" provisions. Let us make a bold and straight forward attack on the energy crisis and not one encumbered by narrow minded thinking. It is in the usual pattern of our nation to find a solution to a problem and then solve it with bold initiatives.

AT RISK PROVISION NOT CONSISTENT

The "at risk provisions" of the tax code should not apply to the development of critical alternative energy sources at least for the time of their gestation, let us say five years. It is not consistent with large related public programs. It works against public policy. If the risk provisions are at least temporarily dropped we will have a viable new industry to point to and the advantages of low cost, virtually nonpolluting energy available to substantial sections of our country.

We realize that the foregoing proposals substantially increase the incentives that the Energy Bill would give to geothermal, but these incentives are required in an industry where only 30 wells were drilled last year. The major constraint to development is capital. The comparison is often drawn to oil

and gas. But oil and gas drilling is generally known and understood. Investors have been financing oil and gas wells for decades. Geothermal pipelines and retrofit to geothermal heating and cooling is new to the American investor. Even if such provisions were to be in effect for a limited period, say until 1883, Congress has it within its power to cause substantial private investment be made in the geothermal market place. We believe that the apple is preferrable to the stick. By a strong energy package, Congress can insure that the required capital investments are made, because the necessary inducements will then be available.

We urge your strongest consideration of our proposals. We urge action with bold new solutions to meeting our crucial energy supply problems. We urge reaffirmation of our private enterprise system by the stimulation of increased, private capital investment in what are perceived as high risk energy investment areas. By providing substantial credits, say for a limited period of five years, a new and healthy competitor for oil and gas can be developed in the least overall cost method. If we are to do in five years what it took oil and gas 25 years or more to accomplish we need additional private capital. The system of credits we have proposed which was in part supported by your committee in the 94th Congress would do much to assist our industry. Your consideration is much appreciated.

We stand ready to answer any questions you may wish clarified. Please do not hesitate to call on us.

Cordially,

STEPHEN M. MUNSON,
President.

AMERICAN TRUCKING ASSOCIATIONS, INC.,
Washington, D.C., September 14, 1977.

Hon. RUSSELL B. LONG,
Chairman, Finance Committee, U.S. Senate, Washington, D.C.

DEAR Mr. CHAIRMAN: This will refer to the hearings on proposed energy legislation which your Committee is conducting.

The trucking industry has presented an extensive statement on H.R. 6831, the proposed "National Energy Act" which was submitted to the Committee on Ways and Means of the U.S. House of Representatives on May 26, 1977.

In our May statement, we recognized that the energy problem has many facets, that it is extremely complex, and that there are no easy solutions. While recognizing that the trucking industry will have to make sacrifices to avoid the economic repercussions of a continuing energy shortage, we pointed out that the trucking industry has been actively pursuing a program of fuel conservation through utilization of more efficient equipment, improved operating and maintenance practices and more efficient scheduling.

Your Committee will be scrutinizing, in particular, the tax incentives and disincentives in the proposed energy legislation, and it is to these matters that we want to address our remarks. Mr. Chairman, a greater use of fuel efficient trucks could be stimulated with appropriate tax incentives, both in the purchase of fuel saving devices and in the shift in certain lighter truck ranges from gasoline powered to diesel powered equipment.

Enclosed is a paper prepared by our Engineering Department discussing the various fuel saving devices which are available today. The paper indicates the validity of these fuel saving devices from figures developed for the Federal Energy Administration, the costs of the particular items and the potential savings achievable. If a 12 percent fuel saving from utilization of the various fuel saving devices—which is definitely possible—were realized on all larger trucks, a national saving of 1.035 billion gallons of fuel per year is possible.

The paper also estimates that smaller trucks could save 30 to 50 percent of their present fuel usage by replacement with diesel powered equipment rather than gasoline powered equipment. Approximately 160,000 trucks in the class 6 and 7 weight category (19,501 to 33,000 lbs.) were built for domestic use in 1975, the last year for which figures are available. These trucks are primarily gasoline powered, although there has been a slight shift to diesel power. Greater use of diesel equipment has been stymied primarily by the enormously greater initial capital investment required by truck operators in purchasing diesel rather than gas.

With the goal of achieving these fuel savings, we proffer the following tax incentives for your consideration and inclusion in the House passed bill, H.R. 8444. First, we recommend the inclusion of the truck energy saving add-ons discussed herein in the list of qualifying properties for an additional 10 percent investment tax credit for business energy investments, which is contained in section 2061 of H.R. 8444. Such an amendment would create the necessary incentive for all of the various optional fuel saving devices mentioned with the exception of radial tires, which generally have a useful life of less than 3 years. To create a similar incentive for increased use of radial tires, we recommend an appropriate change in the useful life requirements of the investment tax credit provisions to permit a tax credit regardless of the useful life of radial tires.

Finally, in order to create an appropriate incentive for the purchase of diesel powered equipment in the class 6 and 7 categories, an additional 2 percent investment tax credit should be allowed. Such a saving should be adequate to offset the 20 to 30 percent increase in purchase price sufficiently to induce a carrier buying vehicles in these weight ranges to purchase diesel, rather than gasoline powered equipment. Also, there should not be any grave concern over a significant "boon" to carriers already operating diesel equipment, since the statistics cited in the accompanying paper tend to indicate that less than 8 percent of the equipment in this weight range are diesel powered today.

We thank you for your consideration of our suggestions, and respectfully request that you include this letter with attachment as part of the hearing record in connection with your consideration of the energy bill.

Sincerely,

BENNETT C. WHITLOCK, Jr.

Enclosure.

TRUCK FUEL-SAVING DEVICES

Spurred on by the energy shortage, vehicle and engine manufacturers and their suppliers have developed numerous fuel saving improvements and devices. In many cases purchase of such equipment results in an added capital cost to the truck operator. The applicability and effectiveness of each particular fuel saving option or combination of options varies according to the type of equipment, type of carriage and the routes to be traveled.

The percentage fuel savings to be derived from the various approaches that have been made are spread over a wide range as indicated in the chart below.

FUEL SAVINGS FROM TECHNOLOGICAL IMPROVEMENTS

Fuel saving mechanism	Percent fuel savings	
	High	Low
General freignt carriers:		
Engine and drivetrain	25.0	2.0
Fan clutch	8.0	2.5
Radial tires	10.0	4.0
Wind deflector	12.0	2.0
Total	55.0	10.5
Bulk carriers:		
Engine and drivetrain	4.5	
Fan clutch	4.5	
Radial tires	11.0	
Total	20.0	
Household goods carriers:		
Engine and drivetrain		
Fan clutch		
Radial tires	48.0	
Wind deflectors		
Total	48.0	

Source: Data compiled by ATA from a study prepared by Jack Faucell Associates for the Federal Energy Administration, 1976.

Likewise the costs of the various items are also widespread, depending upon the particular device involved. Following are list prices for fuel saving options on new equipment.

New tractors

Engine Group:	Typical list price
Demand actuated cooling fan	$440
Automatic radiator shutters	225
Road speed governor	150
Fuel consumption indicator	100
Cab-mounted streamlining devices	350

Used tractors

Any of the above items at roughly twice the list price shown to include installation.

New trailers

Smooth sides (no exterior posts)	$400
High cube (wedge trailers)	800
Anti-drag trailer nose cone	400

Radial tires

Radial tires cost roughly 13 percent more than their bias-ply counter parts. As tire prices vary widely with both the size of tire obtained and the quantity purchased, it is difficult to give a "typical" list price.

The annual registration of new class 8 vehicles (33,001 lbs. GVW and up) for the years 1975 and 1976 averaged 88,681. For 1977, the number is anticipated to be in excess of 100,000. Of these, it is estimated that 50 percent are being ordered with some extra cost fuel-saving options.

City equipment

Smaller vehicles, Classes 6 and 7 (19,501–33,000 lbs. GVW) are used to carry goods in the city and for pick-up and delivery (p&d) operations. Such equipment includes a common carrier's van, lumber yard delivery truck, public utility truck, bottling company trucks, and school buses.

Typically such equipment is gasoline powered, unlike that already discussed in class 8. Figures given in "MVMA Motor Vehicle Facts & Figures 1976" show there were 161,324 vehicles in those weight classes built for domestic use in 1975, and 12,500 of them had diesel engines.[1]

Use of diesels in such equipment will save fuel. In a city p&d operation the improvement will range from 30 to 50 percent or roughly from 3.5 to 5 mpg.

Going to a diesel engine in such trucks will raise their purchase price from 20 to 30 percent. Roughly for a straight truck having a 20-foot van body and GVWR of around 20,000 lbs. that would be an increase of from $12,500 (with gasoline) to $16,000 (with diesel).

Equipment in use

Considerable energy savings could be achieved by installing fuel saving devices on vehicles currently in use which were manufactured before such equipment became readily available. Limited experience suggests costs of such retrofit to be double that for similar original equipment items.

The size of the potential market for energy saving retrofit action is difficult to estimate but, as a guide, diesel truck tractor registrations in the USA for the year 1975 totalled 1,115,877 and for semitrailers 2,270,310[2] of which latter approximately 50 percent or 1,135,155 would be van bodied trailers. By no means would it be economic or practical to retrofit all of these even given a tax incentive. However it is reasonable to assume that, given such incentive and taking into account the constraints of time and availability of retrofit items, operators of 25 percent[3] of the nominal 1 million each, tractors and semitrailers, could be interested in becoming involved in such retrofit action. Assuming average retrofit expenditures of $1,000 per tractor and $500 per trailer—not including radial tires—we are talking in terms of total sums eligible for tax credit consideration of—

Tractors 250,000 times 1,000 equals $25 million.

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[1] Source—Motor Vehicle facts and figures—1977 pages 16–17 published by Motor Vehicle Manufacturers Association of U.S.A.

[2] Source—Motor Vehicle facts and figures—1977, page 26, published by Motor Vehicle Manufacturers Association of U.S.A.

[3] Source—This estimate is derived from the figures quoted for average age of trucks—page 33 of MVMA 1977 facts and considering that one half of the 50 percent of tractors over 2 years old and less than 8 years of age would be potential candidates. The same logic is applied to the van-bodied trailers.

Trailers 250,000 times 500 equals $1.25 million.

This has to be considered in relation to estimated fuel savings. From preliminary industry tests already carried out, a conservative estimate is that 12 percent overall fuel saving could be achieved, which could translate into a national saving of 1.035 billion gallons of fuel per year based upon the total annual fuel consumption figures of class 8 heavy trucks of 8.627 billion gallons as estimated in the Joint EPA/DOT Panel Report No. 7 of 1973.

FREEPORT MINERALS CO.,
New York, N.Y., September 8, 1977.

Hon. RUSSELL B. LONG,
Chairman, Committee on Finance, U.S. Senate, Dirksen Senate Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: I refer to your press release dated July 21, 1977 announcing public hearings on Title II of H.R. 8444 (formerly H.R. 6831), "The National Energy Act," wherein you invited written testimony from persons or organizations desiring to submit statements for the record.

For that purpose, Freeport submits for the reasons outlined below that the operation of Freeport's Frasch sulphur mines in the offshore coastal waters and coastal wetlands of Louisiana presents a unique situation which clearly requires exemption from the proposed tax on business use of oil and natural gas contained in section 2041 of H.R. 8444. With respect to these mining operations, the underlying objectives of the tax, i.e., conversion to coal and/or increased conservation, are not achievable. It is Freeport's position that the imposition of the tax in such circumstances would represent a punitive action inconsistent with the aims of the legislation.

MINING SULPHUR BY THE FRASCH PROCESS

The Frasch mining process, which accounts for about 60 percent of domestic sulphur production, requires that superheated water be pumped into subsurface sulphur deposits through a well much like an oil or gas well. The sulphur is melted underground and then pumped to the surface as a molten liquid. Each sulphur mine has large plant facilities which utilize natural gas as an energy source to heat the water.

CONVERSION TO COAL IS NOT FEASIBLE

One of the Freeport Frasch sulphur mines is located seven miles offshore in the Gulf of Mexico on a platform positioned 125 feet above the ocean floor. Another mine is located in the marshlands, within sight of the Gulf of Mexico and within the boundaries of a wildlife preserve. The plant facilities at this latter installation are supported entirely by piling and both access to the mine and travel within the confines of the mine site area require the use of motorboats.

Neither mine was constructed with coal-burning capability nor with the capacity to store coal in the quantities needed. Furthermore, the environmental problems associated with coal storage and handling and flyash disposal at these ecologically sensitive locations are particularly acute.

HIGH ENERGY EFFICIENCY OF THE FRASCH PROCESS OFFERS VIRTUALLY NO POTENTIAL FOR ADDITIONAL CONSERVATION

Since fuel costs are a controlling item of expense in the production of sulphur by the Frasch process, Frasch sulphur producers have historically been vitally concerned with maximizing energy conservation. The extremely high thermal efficiencies achieved by the industry are acknowledged in the following quote from the 1975 edition of "Mineral Facts and Problems" published by the Bureau of Mines of the Department of the Interior:

"The process waters range from fresh water to brackish water to seawater. Because of inherent technical considerations, which include direct-contact combustion to a large extent, it is highly desirable—in fact, almost essential—that a completely sulphur-free fuel be used. *The Frasch industry uses natural gas exclusively for this purpose, and realizes a 90-percent efficiency in the use of this fuel.*" (Page 1073. Emphasis supplied.)

In view of the 90 percent efficiency already achieved in our operations, the opportunity for increased energy conservation in the mining of sulphur by the

Frasch process is for all practical purposes non-existent. By comparison, steam generating electric utility power plants obtain operating efficiencies of between 35 percent and 40 percent.

ACTION BY OTHER COMMITTEES

Freeport's unique situation has been acknowledged in other Congressional Committees dealing with the President's energy program. The Senate Energy Committee has specifically exempted from the coal conversion requirements of S. 977 existing major fuel burning installations "for the extraction of mineral resources located (A) on or above the Continental Shelf of the United States or (B) on wetland areas adjacent to the Continental Shelf of the United States where coal storage is not practicable or would produce adverse effects on environmental quality."

The House Ways and Means Committee, in acting upon the tax provisions of H.R. 8444, recognized that a blanket imposition of the tax on business use of oil and natural gas would result in inequities in certain unique situations. As a result, H.R. 8444 provides the Secretary of the Treasury with authority to reclassify as an exempt use those plants or types of uses which offer no significant potential for reducing oil or gas use through conversion or conservation. In discussing the manner in which the Secretary's reclassification authority would be exercised the Committee report states, at page 104:

"For example, a mining facility too remote to allow economical transportation of coal and which had boilers which did not have conservation potential might be considered by the Secretary for reclassification."

This statement in the Committee report is based on colloquys between a member of the Committee and Committee staff and Treasury representatives which confirmed that an exemption could be granted by the Secretary for operations like Freeport's which are located in the "offshore and marsh areas of Southern Louisiana".

The Ways and Means Committee thus expressly addressed the situation of Freeport's offshore and coastal marshland mines as the prototype case for exemption by the Secretary.

THE FACTS AND BASIC FAIRNESS REQUIRE AN EXEMPTION

It does not require a technical hearing or other bureaucratic proceeding to establish the enormous environmental, logistic, and plant alteration problems associated with the conversion to coal of sulphur mines located offshore or in the coastal marshes of the Gulf of Mexico. Nor does it require a technical hearing to establish that an industrial process with a recognized 90% energy efficiency offers little potential for significant additional conservation.

Nonetheless, H.R. 8444 in its present form would subject Freeport to a lengthy and costly administrative procedure in order to gain an exemption which is, on its face, clearly warranted.

We therefore request that your committee address this problem and, if possible, provide a specific legislative solution.

Respectfully,

WILLIAM J. BYRNE, Jr.,
Vice President and Treasurer.

STATEMENT OF THE AMERICAN HOTEL AND MOTEL ASSOCIATION

The American Hotel and Motel Association is a federation of hotel and motel associations located in the 50 states, the District of Columbia, Puerto Rico and the Virgin Islands, having a membership in excess of 6,500 hotels and motels containing in excess of 850,000 rentable rooms. The American Hotel and Motel Association maintains offices at 888 Seventh Avenue, New York City, and at 777 14th Street NW., Washington, D.C.

We appreciate this opportunity to present for the "Record" the views of the lodging industry regarding the "National Energy Act".

Our industry is a $12 billion, one employing approximately 1 million workers. We are part of the tourism and travel industry which has annual sales of approximately $70 billion and employs over 4 million workers. Tourism and travel ranks as one of the three top industries in 46 of 50 states.

The American Hotel & Motel Association has had an energy program in effect for the past three years. The American Hotel & Motel Association has been actively developing and implementing an energy management program for the benefit of its members and the general public.

In the past two years, AH&MA and its members have spent approximately $300,000 in funds and thousands of man hours donated by the membership in the development of this program. The purpose and intent of the program is to provide the informational and educational tools which will enable the individual hotel and motel operators to develop their own long range energy management program by which they can conserve energy.

The program generally consists of the following:

A. Educational:

1. Seminars;
2. Information Guides;
3. Instructive Posters; and
4. Energy Management Posters.

A large comprehensive handbook has been developed, published and distributed to its members and the general public which may request it. This handbook has been acknowledged as one of the finest that has been developed to date. The handbook is presently undergoing revisions and additions to increase its value.

5. Energy Technical Center.

A technical center has been opened in San Antonio, Texas. The purpose of the technical center is to collect and disseminate any and all information which becomes available relative to energy, and the conservation of energy which will assist the hotel operators and the general public in the techniques of energy conservation. The technical center is developing a comprehensive library and is presently in the process of developing a technical supplement to the already published energy manual.

Even preceding the Arab oil embargo, the hotel/motel industry pledged itself to the purposes of energy conservation which they later confirmed in a formal pledge to President Ford. This pledge was recently reconfirmed to President Carter during the recent fuel crisis caused by the severe winter. The industry firmly believes that a national energy policy is an absolute necessity to the continuing well being of our nation. The comprehensive energy policy will establish the necessary framework within which it can work in the development of its own energy conservation program.

The lodging industry is essential to the operation of commerce and industry. Without lodging, travel would be impossible, business could not be conducted, intercity meetings could not be held and for that matter the present hearings would not be possible.

Therefore, it is essential that the energy policy deliberations provide due consideration to the idiosyncracies of the lodging industry (24 hours a day, 7 days a week) and the essential nature of its functions.

Hotel/motel complexes are not typical of other types of structures nor are they typical amongst themselves. They are cities within cities, comprised of various combinations of guest rooms, meeting rooms, restaurants, laundries, entertainment, athletic facilities, commerce, offices, etc.

Hotels come in all shapes and sizes, they are designed to meet the needs of the guests and other businesses.

The majority of the hotels and motels throughout the nation are operated by small independents, owning one or two properties. The majority of those hotels and motels carrying the name of prominent national chains are privately owned and operated through franchise agreements. These independent operators need considerable help in their efforts to conserve energy. AH&MA studies indicate that while an effective energy management program can reduce the consumption of energy, large quantities of energy can be saved through fiscal motivation, replacement and retro-fitting of the now existing inefficint systems. These, of course, require considerable investment on the part of the individual property owner and can only be done if the return on the investment for energy conservation and improvements are economically feasible.

The necessity of the additional investment tax credit in H.R. 8444, recently approved by the House, will greatly assist the hotel/motel operator in his efforts to improve energy systems on his property. Unfortunately, H.R. 8444 does not provide for an investment tax credit when entire inefficient and decadent systems are removed and replaced with new equipment.

We strongly recommend that provisions be made in the Senate variation of the bill to provide additional investment tax credit for the replacement of inefficient equipment or systems or where substantial energy conservation can be accomplished.

In most cases, large investments will be required by the operator in providing improvements, or replacing of the present inefficient systems. The financing of these improvements must come from the cash flow of the property, and from banking and insurance loan resources.

Although in some cases the funds may be readily available, the return on investment is far from good, more often than not, the return on investment is not good, and the paycheck is extremely long (over 5 years). In the case of hotel/motel properties whose profitability is marginal, and the properties are old "25–50 years," the economic benefits in investing in energy conservation improvements may not exist within the present framework of the tax laws. These properties, because they are marginal and are old, generally are big wasters of energy and present the greatest opportunities for energy conservation.

The increased energy cost that the lodging industry faces will undoubtedly cause many of these marginal and old properties to close if they are not provided with an economical solution to their energy dilemma.

The additional investment tax credit could very well be the economic salvation of many of these properties. Hotel operations are very labor intense providing many jobs to the entire spectrum of the labor market, including many job opportunities to minorities and low-income people.

Further, many of the marginal and older hotel properties are located in the core of our large cities and would only contribute to the already present decay if they are forced to close.

AH&MA strongly urges the passing of the proposed additional investment tax credit for energy conservation improvements. These improvements should include the investment in any new equipment, controls thermal insulation, enclosures, and weatherizing which will substantially contribute to the conservation of energy and will provide the economic return to the property owner within a reasonable time.

These improvements will not only preserve the jobs in existing properties but will also create new jobs in the manufacturing, construction and installation of these improvements.

The qualified improvements identified in the bill for investment tax credit should also include the renovation of existing systems, and the addition of meters needed to track energy consumption which are necessary to an effective program.

It is our view that co-generation can be beneficial to the operation of the larger hotel properties. The efficiencies that can be accomplished are considerably greater than can be achieved by the present electric generating plants and can be beneficial to the hotel operator, the utility company and the nation as a whole in accomplishing energy conservation. In order for co-generation to be economically feasible it is essential that the institutional and the legal barriers be removed. The benefit of an additional investment tax credit would improve the economics of co-generation making this concept feasible in more applications than would otherwise be possible.

We are pleased that H.R. 8444 provides an exemption to residential and commercial businesses from this tax. We urge the Senate to include this provision in their version of the bill as it would be extremely burdensome to the hotel/motel industry if such a tax was to be imposed upon their consumption of fuel.

In most cases because of the size and nature of the hotel facility it would be impossible for them to convert to coal and, therefore, they would have no choice but to accept the increased costs and in turn be forced to increase their rates and charges to the guests.

We are further concerned that the excise tax imposed upon utilities, gas and oil consumed would merely be passed on to the consumer if the utility chose not to convert to coal. We further suggest that the Committee consider safeguards to protect the public from this eventuality.

H.R. 8444 does not provide any incentive to those industries to invest in exploration and drilling in the search for new reserves. AH&MA further believes that we should develop all available oil and gas resources to reduce our needs for imports with its inherent liabilities. The companies doing the exploration must have sufficient price incentive to justify the risks and to afford them the

opportunities to research better techniques in the development of recovering both our present and future oil and gas reserves.

AH&MA further recommends to the Senate that they provide the pricing incentives that are required to encourage exploration and development of new oil and gas reserves.

We will be happy to provide any additional information which the Committee may desire to support this presentation.

STATEMENT OF FLOYD R. SMITH, CHAIRMAN OF THE BOARD AND CHIEF EXECUTIVE OFFICER, GULF STATES UTILITIES CO.

SUMMARY OF TESTIMONY

We endorse a National Energy Program which encourages conservation and which will decrease our dependence on imported oil through a program which will not discriminate against our consumers in Texas and Louisiana.

The Energy Tax Act imposes a harsh, discriminatory, and penalizing tax on the fuel which is burned in our facilities although there is no other practical option available. The escalating cost of oil and gas is bringing about a voluntary conversion to other fuels and any additional tax will not aid a speedier conversion, but will only cause an increase in the electric energy cost to our consumers.

We support the elimination of the user tax and crude oil equalization tax from the House-passed bill.

The conversion to coal and nuclear of existing gas and oil-fired units by 1990 would cause a capital expenditure of $5.7 billion, almost four times our current plant investment.

The economic penalties imposed through such burdensome capital requirements and taxes will not result in any significant fuel savings, but instead would force waste of a resource by abandoning productive and useful generating capacity which is fueled by oil and gas.

The consequence of this legislation will be to more than double the cost of electricity to our consumers at a time when they are feeling the pinch of higher electric costs because of the skyrocketing price of fuel.

My name is Floyd Smith and I am chairman of the board and chief executive officer of Gulf States Utilities Co. Our Company provides the electric service needs of a total population of approximately 1.4 million people scattered throughout a 28,000 square mile area in Southeast Texas and Southwest Louisiana. We also supply electric energy at wholesale rates to various municipalities and rural electric cooperatives. In addition, we have interconnections with other utilities for the exchange of electric power. Our Company supplies a service area which contains a high concentration of industry, particularly in the petroleum and chemical fields. All of the major generating facilities in our Company had been designed and constructed to burn natural gas as their primary fuel source until it became evident that there was going to be a shortage of natural gas. Some of the generating facilities were also designed to burn fuel oil for a short period of time in case of an emergency but were not designed to burn fuel oil for any substantial period of time. We currently have three generating units which are capable of continuously burning oil as a fuel as well as gas. The last unit which went into service is designed to use oil as its primary boiler fuel. In the future, we have no plans for the new construction of oil and gas-fired generating units and all future base load units are planned to be either coal or nuclear.

We fully support a national energy program that is designed to lessen our dependence on foreign oil, as well as a program which is designed to shift dependence from oil and natural gas to coal and nuclear fuels. We likewise endorse the program that emphasizes conservation. I must say however that the proposed National Energy Act as passed by the House does not meet the objectives in a fair and equitable manner. The bill itself is discretionary and penalizes the utilities and their customers who happen to be located in our particular part of the country.

We have spent millions of dollars converting our major boilers to permit the burning of oil for extensive periods of time. At the time these modifications were accomplished, we did not anticipate that we would be converting these units to coal-fired units, so the practical effect is that very good, useful generating facili-

ties must be scrapped and replaced with either new coal or nuclear facilities. This will be costly to our customers, as they are the ones that will eventually have to pay the bill.

The legislation as passed by the House of Representatives imposes taxes on our customers on top of the costs they are having to incur by virtue of our previous shift from natural gas to oil and the accompanying high price of oil. The purpose of the National Energy Act was to provide incentives for utilities who currently use oil and gas to shift to coal and nuclear. All of our base load plants in the future will either be coal or nuclear-fueled, as we are currently required to eventually phase out the use of natural gas as a boiler fuel in Texas, and the dwindling supplies of oil with its increased cost will eventually provide all of the incentive that is needed to shift to coal and nuclear. We do not need additional taxes, and the taxes will not provide any incentive that will cause us to convert any quicker than we are already converting.

If the provisions of H.R. 8444 as they relate to electric utilities are implemented, the electricity users will face a significant additional cost burden. The Act will more than double the cost of electricity to residential customers of Gulf States utilities. Converting or replacing 5,800,000 kilowatts of generating capacity from gas and oil to coal will require an expenditure of approximately $5.7 billion which is almost 4 times the Company's total investment in its electric facilities. The replacement of existing gas and oil-fired boilers with coal-fired boilers, while retaining existing turbines, generators, and other equipment would cost $3,379,338,000 plus accumulated fixed charges through 1990 or $1,853,477,000.[1]

The cost of the scrubbers would equal $1,616,995,000 with operation and maintenance costs adding $579,868,000 through 1990.[2]

The estimates for scrubbers are based on a cost of $100 per kilowatt in 1976 dollars and the O & M expenses of $10 per kilowatt per year in 1977 dollars. The accelerated depreciation on oil and gas units due to replacement and conversion to coal increases normal depreciation to more than $84,000,000 through 1990.[3]

The estimated taxes on the use of natural gas as boiler fuel for the two-year period 1983 through 1984 is estimated to be $153,663,000.[4] No natural gas is expected to be burned as a boiler fuel after 1984. The estimated taxes on oil use as a boiler fuel through 1989 is estimated to be $220,514,000.[5]

The crude oil equalization tax for the years 1978 through 1981 are estimated in our Company as follows:

1978	$17,855,750
1979	36,762,412
1980	77,956,380
1981	73,739,200
Total	[6] 206,313,742

In addition to scrapping efficient generating plants fueled by oil and gas that have a substantial remaining economic life, the customers would be required to pay the oil and gas use tax which is offset to some extent by credits allowed and consequently increase the price of our product to our customers. This is true against the additional investment tax credit. However, the tax provisions as they now stand would increase the taxes as far as our Company is concerned, even though we will be taking the necessary steps to convert from oil and gas as boiler fuels to some alternative energy source. The additional cost occurs because the legislation in its present form denies the regular investment tax credit of 10 percent for any qualified conversion investment which is used as a credit to offset the user tax. So, even though the user tax might be fully offset by the conversion investment, the cost to the customer will still increase because the investment tax credit is lost. It would seem much more equitable and less discriminatory if the regular investment tax credit would be permitted and only the additional 10 percent credit would be affected.

In summary, a fast changing energy policy which forces conversion to alternate fuels for the generation of electricity should not have a discriminatory impact on consumers in our part of the country. The equalization tax on crude oil is

[1] See exhibit A attached.
[2] See exhibit B attached.
[3] See exhibit C attached.
[4] See exhibit D attached.
[5] See exhibit E attached.
[6] See exhibit F attached.

unfair when you consider that this particular tax is going to be redistributed to people in another part of the country who just happen to have oil for home heating purposes, but those consumers who happen to get heat from electricity that is provided through oil generation facilities pay the tax but do not receive the benefit of the rebate to the same extent.

We would like to recommend to the Committee that all existing utility oil and gas-fired generating plants which were either in existence or under construction on April 20, 1977, be specifically exempted from the oil and gas use tax.

The additional investment tax credit does not in and of itself provide much of an incentive for speedier conversion since companies with large construction programs, such as our own, cannot fully utilize the existing investment tax credit anyway.

It is strongly urged and recommended that the crude oil equalization tax and the user taxes be deleted from the House passed version of the National Energy Act.

We need encouragement and assistance in the form of faster licensing for nuclear plants and more realistic environmental regulations. We need a more realistic time frame to convert existing units. We do not need additional taxes, higher costs for our customers to bear, and more federal regulation.

EXHIBIT A

REPLACING EXISTING BOILERS WITH COAL-FIRED BOILERS [1]

[In thousands of dollars]

	Accumulated cost	Fixed charges
1984	181,979	30,936
1985	593,509	100,897
1986	871,207	148,105
1987	1,242,677	211,255
1988	1,950,307	331,552
1989	2,683,797	456,245
1990	3,379,338	574,487
Total		1,853,477

[1] This cost table shows the cost of replacing boilers (gas/oil) with coal-fired boilers. Turbines, generators, etc., would not be replaced.

Assumptions: Convert all existing gas and oil units to coal by 1990 except Neches and Louisiana station.

EXHIBIT B

ESTIMATED IMPACT OF USING SCRUBBERS ON ALL NEW COAL-FIRED UNITS [1]

[In thousands of dollars]

	Accumulated cost	Fixed charges	Operation and maintenance costs
1984	66,048	11,228	6,144
1985	278,016	47,263	26,112
1986	468,515	79,648	46,055
1987	681,455	115,847	69,285
1988	1,063,955	180,872	109,557
1989	1,353,515	228,398	143,483
1990	1,616,995	274,889	179,232
Total		938,145	579,868

[1] Includes all existing generation of 5,800,000 kW.

ASSUMPTIONS

Additions of SO_2 scrubbers to all coal-fired generation including Nelson 5 and 6: Capital cost $100/kW in 1976 dollars. Escalation at 7 percent per year.

Operating and maintenance expenses: $10/kW/yr. in 1977 dollars. Escalation at 7 percent per year.

EXHIBIT C

ACCELERATED DEPRECIATION ON OIL AND GAS UNITS DUE TO REPLACEMENT AND ON OIL AND GAS BOILERS DUE TO CONVERSION TO COAL

[In thousands of dollars]

	Undepreciated balance	Accelerated depreciation	Normal depreciation	Increase
Year:				
1977	257,568	19,963	12,262	7,701
1978	237,605	19,963	12,262	7,701
1979	217,642	21,534	12,922	8,612
1980	196,108	23,106	13,582	9,524
1981	173,002	23,106	13,582	9,524
1982	149,896	23,106	13,582	9,524
1983	126,790	23,106	13,582	9,524
1984	103,684	23,106	13,582	9,524
1985	80,578	17,453	13,582	3,871
1986	63,125	17,453	13,582	3,871
1987	45,672	17,453	13,582	3,871
1988	28,219	14,110	13,582	528
1989	14,109	14,109	13,582	527
Total	1,693,998	257,568	173,266	84,302

EXHIBIT D

ESTIMATED TAXES ON USE OF NATURAL GAS

	Quantity	Cost
The tax on natural gas for boiler use is projected as follows:		
1983	$128,053 \times 10^9$	$70,429,000
1984	$128,053 \times 10^9$	83,234,000
Total		153,663,000

Note: Tax rate—1983, $0.55/MMBtu; 1984, $0.65/MMBtu; 1985, $0.75/MMBtu. We do not anticipate burning any significant quantity of natural gas after 1984.

EXHIBIT E

ESTIMATED TAXES ON OIL USAGE FOR BOILER FUEL

	Barrels	Tax at $1.50 per barrel
1983	30,688,000	$46,032,000
1984	24,021,000	36,032,000
1985	30,906,000	46,359,000
1986	27,093,000	40,640,000
1987	19,578,000	29,367,000
1988	10,905,000	16,358,000
1989	3,817,000	5,726,000
1990	0	
Total		220,514,000

Note: Assumptions—All existing oil and gas fired units replaced or converted to coal.

EXHIBIT F

HB-8444 (SECTION.4986)
CRUDE OIL EQUALIZATION TAX

Base Assumptions:

(1) 1 Barrel of Crude Oil equals 1 Barrel of Refined Product

(2) 100% of Crude Oil Equalization tax will be passed on directly to user.

(3) Refiner Acquisition Cost -- 1978
Lower Tier -- $5.25 per Barrel
Upper Tier --$11.28 per Barrel

(4) No Natural Gas liquids are used through the refinery process.

(1) 1978 -- One-Half difference between upper and lower tier prices -- only lower tier oil is TAXABLE.

(A) Upper tier -- $11.28 per Barrel
Lower tier -- $5.25 per Barrel

$ 6.03 per Barrel difference

½ x $6.03 = $3.02 per Barrel

(B) GSU projected oil requirements - 21.5 x 10^6 Bbls.

(C) Use: 55% Domestic 45% Foreign (1) footnote

(D) Use: 50% Lower Tier Oil (2) footnote

(.50) (.55) (21.5 x 10^6) (3.02) =

$17,855,750 Crude Oil Equalization Tax for 1978

1979 -- Difference between Upper and Lower Tier prices only lower tier is TAXABLE.

(A) Upper Tier -- $11.28 + .68 *esc. = $11.96 per Barrel
Lower Tier -- $5.25 + .32 esc. = $5.57 per Barrel

$6.71 per Barrel Difference

* Use escalation of 6% compounded annually. (3) footnote

August, 1977

(B) GSU projected oil requirements = 24.35×10^6 Bbls.

(C) Use: 50.0% Domestic Fuel under current two tier pricing system

(D) Use: 45% Lower Tier Oil (4) footnote

$(.45)\ (.50)\ (24.35 \times 10^6)\ ($6.71) =$

$36,762,412 Crude Oil Equalization Tax for 1979

1980 -- Difference between "controlled" price of each classification of Crude and the "uncontrolled" price. All controlled oil is taxable.

(A) World Price of Oil $13.50 escalated* (As of 1977)
1978 -- 13.50 + .81 esc. = $14.31 per Barrel
1979 -- 14.31 + .86 esc. = $15.17 per Barrel
1980 -- 15.17 + .91 esc. = $16.08 per Barrel

* Use escalation of 6% compounded annually.

(B) Upper Tier -- $11.96 + .72 esc. = $12.68 per Barrel
Lower Tier -- $5.57 + .33 esc. = $5.90 per Barrel

Weighted Controlled Price

$(.46)\ (5.90) + (.54)\ (12.68) =$

2.71 + 6.85 = $9.56 per Barrel

(C) Price difference between "world" and controlled

$16.08 - 9.56 = $6.52 per Barrel

(D) Use: 45% of Domestic Fuel under current two tier pricing system.

(F) GSU Fuel Oil Requirements = 26.57×10^6 Bbls.

$(26.57 \times 10^6)\ (.45)\ (6.52) =$

$77,956,380 Crude Oil Equalization Tax for 1980

(3)

EXHIBIT F(Cont'd)

1981 -- Difference between "controlled" price of each classification of crude and the "uncontrolled" price -- All controlled oil is taxable -- These taxes expire on September 30, 1981.

(A) World Price of oil -- $16.08 per Barrel escalated

$16.08 + $.96 esc. = $17.04 per Barrel

(B) Upper Tier = $12.68 + .76 esc. = $13.44 per Barrel
Lower Tier = $5.90 + .35 esc. = $6.25 per Barrel

Weighted Controlled Price =

(.445) (6.25) + (.555) (13.44) =

2.78 + 7.46 = $10.24 per Barrel

(C) Price difference between "world" and controlled

$17.04 - $10.24 = $6.80 per Barrel

(D) Use: .40% of Domestic Fuel Oil currently under two tier pricing system.

(E) GSU Fuel requirements (For the year) = 36.14 x 10^6 Bbls.
Estimated GSU fuel requirements (as of Sept. 30, 1981) = 27.11 x 10^6 Bbls.

(.40) (27.11 x 10^6 ($6.80) =

$73,739,200 Crude Oil Equalization Tax for 9 months of 1981

TOTAL 1978 - $17,855,750
1979 - $36,762,412
1980 - $77,956,380
1981 - $73,739,200

$206,313,742 Crude Oil Equalization Tax

August, 1977

EXHIBIT F(Cont'd)

FOOTNOTES:

(1) In July, crude imports were on the order of 6,500,000 barrels per week. Crude domestic production was 8,100,000 per week. Total domestic production thus accounts for about 55% of total oil supply.

Source: Oil & Gas Journal, The Petroleum Publishing Co. August 1, 1977, Vol. 75, #31, Tulsa, Oklahoma.

(2) Lower tier oil has accounted for around 50% of Domestic production sold at the well head.

Source: Monthly Energy Review, Office of Energy Information & Analysis, FEA, May 1, 1977 Washington, D.C.

(3) Under Carter Energy Plan "controlled" oil would be escalated to rate of inflation. Assumed 6%.

Source: President Carter's National Energy Plan Detailed White House Report covering statement by President -- April 29, 1977

From: Energy Users Report, Bureau of National Affairs, Inc., Supplement 107 May 5, 1977, Page 21: 0736

(4) Use 5% for annual decrease of "old" reserves

Source: Same as 3 -- From graph, page 21:0725

August, 1977

BORG-WARNER CORP.,
GOVERNMENT RELATIONS OFFICE,
Washington, D.C., September 12, 1977.

Re Title II—National Energy Act 1977.

Mr. MICHAEL STERN,
Staff Director, Senate Committee on Finance, Dirksen Senate Office Building, Washington, D.C.

DEAR MR. STERN: We would like to have the attached statement, by our Mr. Donald L. Rittgers, Residential Product Manager for York Division, Borg-Warner Corporation placed in the Committee Record.

We are also attaching copies of our product literature covering the Champion High Efficiency Air-to-Air Heat Pump and the recently introduced MaxiMizer Add-on Heat Pump.[1] We would like to offer the use of one of our Champion Heat Pump demonstration units if this would serve any purpose to the Committee.

Mr. Rittgers, who is headquartered in York, Pennsylvania would be pleased to come to Washington discuss his statement with your staff.

Additional copies of the enclosed information are available as required.

Best regards.

Yours sincerely,

J. W. CHANDLER,
Director, Government Relations.

[1] The literature referred to was made a part of the committee file.

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STATEMENT OF THE YORK DIVISION OF BORG-WARNER CORPORATION, D. L. RITTGERS, RESIDENTIAL PRODUCT MARKETING MANAGER

Speaking on behalf of the York Division of Borg-Warner Corporation, we would like to take this opportunity to present our viewpoint on the subject of tax credits for heat pumps as an energy conservation system.

My name is Don Rittgers and I have been a part of the York organization for a total of six years and presently serve as Residential Product Marketing Manager. My formal education includes B.S. Degrees in Physics and Mathematics, M.S. and Masters in Business Administration.

York markets a variety of air conditioning, heating and refrigeration products, from small room air conditioners to a system serving the tallest sky scraper, on a world-wide basis. The company was formed in 1874 and entered the mechanical cooling field in 1885, giving us a history of expertise in controlling temperatures that is virtually unparalleled. York operates two manufacturing facilities—one in York, Pennsylvania and another in Madisonville, Kentucky. The Madisonville plant is devoted entirely to Unitary Products, a term used in our industry to designate residential and commercial equipment. Two examples of energy efficient products produced at the Madisonville facility, both introduced within the last 15 months, are our Champion High Efficiency Heat Pump line and Maximizer Add-on Heat Pump line. Both products use a built-in solid state computer module to control operation so that maximum efficiencies can be obtained from the electrical input. Both of these systems are efficient as air conditioning units and heating units, as they exhibit cooling EER ratings from 7.3 to 8.0 and heating coefficients of Performance from 2.8 to 3.1 (47°F).

WHY A HEAT PUMP?

In 1973, York took a hard look at the subject of "product possibilities for residential conservation". More specifically, Why a heat pump? We acknowledged that energy conservation was as much a growing concern of our industry as it was for the petrochemical industry. We looked at such things as the source of our energy and the use of our energy. Exhibit No. 1 shows the source of energy that was consumed in the United States, for 1972 UN Department of Economics and Social Affairs, statistical year book. These numbers have not changed dramatically since 1972, with exception of nuclear, which has now increased to 2–4 percent at the expense of natural gas and petroleum oil. Note that almost 50 percent of the energy consumed in the U.S. comes from petroleum oil. The next largest source is natural gas occupying greater than 30 percent. Coal is the third contender showing 17.2 percent of the total.

Exhibit No. 2 shows how these sources are used in the U.S. Note that 33.6 percent of all energy consumption was for residential and commercial purposes. Transportation, which receives much government, industrial and consumer interest, only consumes 25.2 percent of the energy available.

Exhibit No. 3 breaks down each of these categories into major listings that occupy greater than 1 percent. Note that this accounts for 97.1 percent of the total and the largest single user of energy is fuel for transportation, occupying 24.9 percent. The difference between 97.1 percent and 100.0 percent accountability is assumed to be the portion allocated to trolley cars, monorails, electric cars, etc. (Exhibit No. 4). Observing Exhibit No. 3 a little closer, it is seen that the second largest user of energy is space heating for residential and commercial purposes, representing 17.9 percent of the total.

Exhibit No. 5 can be best described as "the proper perspective" since we find that the energy user most talked about by our industry (air conditioning), and many other industries, only represents 2.5 percent of the total, of which residential consumes the largest portion (1.4 percent). Space heating, so often ranked lower in energy priority than air conditioning, occupies 17.9 percent of the total energy consumption picture! This means that if we, as a country, wanted to save 10 percent in energy as a target and we devoted equal interest to air conditioning and space heating, one quarter of one percent of energy savings would be the maximum realized energy conservation through higher efficiency air conditioning, while 1.79 percent would be realized through higher efficiency space heating! Another way of looking at this, is to say that 7.2 to 1 more opportunities exist in the purchase of saving energy through heating efficiency than through air conditioning efficiency (See Exhibit No. 6).

Exhibit No. 7 shows the three major sources of energy under concern, in 1973 and today. Coal, natural gas, and petroleum have been investigated by many more recent studies than the source of this information (Limits to Growth, Meadows, 1972), but we doubt that the synergetic outlook has been more dramatically portrayed. We will not dwell on the known global reserves of the life expectancy of these reserves, but simply wish to identify with the general problem of the unknown rather than the known. Specifically, no one really knows the amount of untapped natural resources that will be available for the next 100 or 200 years. Exhibit No. 7 shows that even if 5 × 1972 known global reserves would be available, and the average projected rate of growth in consumption continues for the future, the life expectancy is still finite.

Exhibit No. 8 shows the countries with the highest percentage of known global reserves of non-renewable energy resources, their respective production rate, and the U.S. consumption (percent) of the total available.

We look at this information in aggregate and conclude the following:

1. The "shift" of energy usage of the earth's resources does not appear to be occurring quickly and, therefore, will not significantly contribute to energy conservation formula in the short term.
2. Unitary (Residential and Commercial) space heating and cooling do contribute a significant factor to the energy conservation opportunity.
3. Unitary air conditioning (cooling) is not the user of energy that a person might expect and, therefore, should not be overly emphasized as a potential energy conservation area.
4. Unitary space heating is a significant area of energy conservation concern. With nearly 18 percent of the total U.S. energy consumption, space heating is one of the most important users of energy to focus on.
5. The most abundant global energy resource, that can readily be matched with known technology, is coal. The U.S. has a greater portion of this resource than any other known non-renewable energy resource.
6. Electrical power generation and growth is probably the best energy alternative of our conservation/growth choices.
7. The electric heat pump serves as a very efficient use of energy delivery in the Unitary Market. Heating efficiency will be at least 50 percent better than electric resistance.

HEAT PUMP OPERATING COST (HEATING SEASON ONLY)

You probably have had a number of presentations on the theory of the heat pump cycle and the process in which it saves energy. However, we would like to make a distinction between a standard air-to-air heat pump and an "add-on" air-to-air heat pump.

The standard air-to-air heat pump operates in similar fashion to a refrigerated air conditioning system. In the cooling mode, it functions exactly the same. In the heating mode, it reverses its cycle and extracts the heat energy from the outdoor ambient and rejects it into the living space. There is a point that it can no longer extract enough heat to fulfill the home's heating demand and is referred to as the "balance point" of the system with the home. For all temperatures above this balance point temperature the heat pump can handle the heat loss of the home without supplemental assistance, and enjoy Coefficients of Performance above 2.0, normally. For temperatures below the balance point, the heat pump is unable to meet the heat loss demand of the home, and electrical supplemental heat is used in conjunction with the heat pump operation. Thus, the Coefficient of Performance for these temperatures is a blend of the COP of the heat pump plus the COP of the supplemental electric heat. The seasonal performance factor (SPF) is the term used in this industry to refer to the heat pump + supplemental heat aggregate coefficient of performance operation over the heating season. Typical SPF values are from 1.6 to 2.5, depending on the climatic conditions, installation practices, and individual unit performance.

The Add-on air-to-air heat pump concept works very similar to the above mentioned process, with exception that it can be added-on to any existing form of heating apparatus. For temperatures above the balance point, the add-on type of heat pump performs identical to the standard air-to-air heat pump system. For temperatures below the balance point, the add-on heat pump may be shut-off or allowed to function in a cycling fashion with the existing furnace, depending

on the manufacturer's design. The most efficient form of add-on heat pump is one which is not shut-off for temperatures below the balance point, but allowed to operate in the "primary mode" down to some temperature lower than the balance point (from 15 to 25°F lower). With this type of design, the heat pump operates as long as it can for temperatures below the balance point, and then the existing furnace is allowed to cycle on, shutting the heat pump off by thermal control. After the furnace satisfies the second stage of the room thermostat, the heat pump is allowed to reactivate. This cycling method of control below the balance point allows for greater energy savings due to the large number of heating hours in this temperature band.

It is with the availability of a standard air-to-air heat pump that the residential new construction home owner can save 50 percent of his energy cost, as opposed to strictly electric resistance heating. Likewise, the home owner with an existing furnace, who may or may not have central cooling, can add the Add-on heat pump system and enjoy similar savings, depending on the type of fuel the existing furnace uses. In either case, from 28 percent to 75 percent energy savings (watts) are possible.

Exhibit No. 9 summarizes the heating season operating costs and energy usage for different types of heating systems, using Nashville, Tennessee as the climatic city (average climate for the U.S.). Even though the operating costs and energy savings shown in this exhibit are slightly higher than the average air-to-air heat pump on the market, they do reflect a relative basis of comparison between fuels. Note that the add-on heat pump (York MaxiMizer™) shows a 47.5 to 56.2 percent energy savings per heating season and a —9.6 percent to +56.1 percent operating cost savings. Therefore, energy is always saved with the MaxiMizer concept, regardless of operating cost savings. Heat pumps can save fossil fuels for both the residential new construction home as well as the existing home.

TAX CREDITS AND RECOMMENDATIONS

York Division of Borg-Warner believes that the use of tax credits will influence the customer to consider more energy efficient products, that may not save operating cost dollars today. As indicated in the operating cost summary (Exhibit No. 9), standard air-to-air heat pumps and Add-on heat pumps may not compete with natural gas fired furnace systems at today's energy differential. However, as fossil fuels become more scarce and undergo a few compounding cost increases, the heat pump will show equal or less operating costs and prove to be an economical investment. On an average, the payback periods for standard air-to-air heat pumps, or add-on air-to-air heat pumps, are 12 to 22 years against natural gas furnaces, 3 to 12 years for oil furnaces, and 1 to 4 years for electric furnaces (assuming heating only, no central cooling equipment). If central cooling were included with these fuels, the payback periods improve by greater than 50 percent.

We would recommend that heat pumps be included in the proposed National Energy Bill and be given the same 20 percent tax credit on the cost of the heat pump installed system. We feel this will provide significant incentive to the consumer to purchase a heat pump. Add-on heat pumps should be considered as part of the "heat pump" definition, since their use in the replacement/modernization market will contribute significant energy savings.

EXHIBIT No. 1

Where does our energy come from?

Source of energy consumed in U.S.:	*Percent*
Petroleum (oil)	45.5
Natural gas	32.3
Coal (including anthracite)	17.2
Nuclear	0.9
Hydro	4.1
Total	100.0

(UN Department of Economics & Social Affairs, Statistical Yearbook–1972.)

EXHIBIT No. 2

How are these sources used in U.S.

	Percent
Industrial	41.2
Transportation	25.2
Residential	19.2
Commercial	14.4
Subtotal	33.6
Total	100.0

EXHIBIT No. 3

End users greater than 1 percent

	Percent
Transportation (full)	24.9
Space heating (residential, commercial)	17.9
Process steam (industrial)	16.7
Direct heat (industrial)	11.5
Electric drive (industrial)	7.9
Feed stocks, raw materials (commercial industrial, transportation)	5.5
Water heating (residential, commercial)	4.4
Air conditioning (residential, commercial)	2.5
Refrigeration (residential, commercial)	2.2
Lighting (residential, commercial)	1.5
Cooking (residential, commercial)	1.3
Electrolyte (industrial)	1.2
Total	97.1

EXHIBIT No. 4

	Percent
Total energy consumed for transportation	25.2
Fuel—consumer for transportation	24.9
Difference	0.3

The 0.3 percent represents other energies used for transportation: Trolley cars, monorails, electric cars, and et cetera.

EXHIBIT No. 5

U.S. energy consumption:	Percent
Air-conditioning (residential)	1.4
Air-conditioning (commercial)	1.1
Total	2.5
Space heating	17.9

EXHIBIT No. 6

This means 10 percent energy savings in—	Net savings (percent)
Air-conditioning	0.25
Space heating	1.79

Or 7.2: 1.0 more opportunities to save with heating efficiency gains than air conditioning efficiency gains.

EXHIBIT No. 7

LOCATION, QUANTITIES, AND CONSUMERS OF RESOURCES

Resource	Known global resources (1972)	Static index (years)	Average projected rate of growth	Exponential index (years)	Exponential index using 5 multiplied by known resource (years)
Coal	5×10^{12}	2,300	4.1	111	150
Natural gas	1.14×10^{15} ft^3	38	4.7	22	49
Oil (petroleum)	445×10^{9} bbl	31	3.9	20	50

Source: "Limits to growth" (Meadows), 9th printing, November 1972, Library of Congress, cat. card No. 73-187907

EXHIBIT No. 8

	Countries with highest resource (1972)	Percent of world total	Prime producers	Percent of world total	U.S. consumption (as percent of world total)
Coal	United States	32	U.S.S.R.	20	19
	U.S.S.R.-China	53	United States	13	
Natural gas	United States	25	do	58	63
	U.S.S.R.	13	U.S.S.R.	18	
Oil (petroleum)	Saudi Arabia	17	United States	23	33
	Kuwait	15	U.S.S.R.	16	

Source: "Limits to Growth" (Meadows), 9th printing, November 1972, Library of Congress, cat. card No. 73-187907.

EXHIBIT No. 9

ANNUAL HEATING SEASON OPERATING COST AND ENERGY USAGE SUMMARY

	Basic system		With MaxiMizer	
	Per year	Btu times 10^6 input	Per year	Btu times 10^6 input
Electric furnace	$756	64.6	$332	28.3
Oil furnace	431	142.3	295	74.7
Natural gas furnace	250	142.3	274	74.7
Propane furnace	648	142.3	320	74.7
Split system heat pump	316	27.0		

	Savings with MaxiMizer ™			
	Dollars per year		Millions of Btu's per year	
	Amount	Percent	Quantity	Percent
When used with:				
Electric furnace	$424	56.1	36.3	56.2
Oil furnace	136	31.6	67.6	47.5
Natural gas furnace	(24)	(9.6)	67.6	47.5
Propane gas furnace	328	50.6	67.6	47.5

Note: Location; Nashville, Tenn. Winter outdoor design temperature: 15° F; winter indoor design temperature: 70° F; building heat loss: 45,000 Btus. Equipment selection possibilities: York split system heat pump (Champion, 3-ton); York add-on heat pump (MaxiMizer 3-ton); Borg-Warner natural gas furnace (Climaster 80 MBH); Borg-Warner oil-fired furnace (80 MBH); York electric furnace (15 kW).

Energy rates: Natural gas equals $0.15 per 100 ft^3; oil equals $0.389 per gallon; electric equals $0.04 per kilowatthour; propane gas equals $0.40 per gallon.

FIRST PARATRANSIT CORP.,
Baton Rouge, La., August 18, 1977.

Hon. RUSSELL LONG,
U.S. Senator, Federal Office Building, Baton Rouge, La.

DEAR SENATOR LONG: On August 10, 1977, Mr. Marvin Glassman was given the opportunity to speak before the Committee of Finance of the United States Senate in behalf of the taxicab industry.

Our company operates a fleet of twenty-four taxicabs in the city of Baton Rouge, Louisiana. We employ over fifty people with an annual payroll in excess of $250,000.00. Our services range from the exclusive rider to a limited shared ride program, we also transport hospital patients, welfare caseworkers, senior citizens (at a reduced rate), the blind, emergency on-the-job injuries, and carpooling employees who work overtime and need transportation from work. In addition we operate an extensive package delivery service utilized by banks, hospitals, blood banks, florists, bakeries, and industrial supply houses.

With this brief synopsis in mind one would assume that we have the potential to be a profitable business. "Potential" is a key word, with the rampant cost increases of gasoline and insurance, it is nigh impossible to keep the red ink from our ledgers.

Price stability would be a luxury for this business but costs seem to soar even on a daily basis. Our company proudly owns the best safe driving record in the country for taxicabs, over 525,000 miles without an accident, yet our insurance premiums have increased over 150% in the past two and one half years.

Gasoline, our largest single expenditure, has increased dramatically in the same period. We use Checker cabs and employ every method of gasoline conservation available. We have considered switching to a different automaker who claims to offer better fuel economy, but the Checker is the most well suited vehicle for service to the elderly and the handicapped who comprise a significant portion of our business.

Our rates are set by local ordinance, that of the City Parish Government of East Baton Rouge Parish. When we request an increase, our books and records are examined to insure that such an increase is totally warranted. Unlike other private industries we cannot raise our prices simply because expenses over a short period of time have increased dramatically. A rate increase takes an extremely long time from its initial proposal to approval and this also restricts our capacity to meet the wild fluctuations of prices.

These rate increases actually hurt our business as those who ride a cab the most, such as the elderly, handicapped, and the indigent can no longer afford to ride a cab. We have reached a point where the theoretical increased volume will no longer match the actual expenditures. The repeal of the Federal Excise on Gasoline would forestall the extent of many rate increases and give our industry some semblance of price stability that it so urgently needs. The taxicab industry has been proven to more cost effective than other forms of public transportation, yet we operate at several disadvantages, including the Excise Tax on gasoline, both on a federal and state level.

The alternatives are frank and few; a repeal from The Federal Excise on Gasoline, or a government supported user-subsidy program so the poor and elderly have some form of cheap reliable transportation they so desperately need. A third alternative is no repeal and no subsidy for the rider, which at the current levels of inflation and coupled with increases in the Excise Tax on Gasoline, would drive many operations from business and everyone loses an inexpensive, reliable and necessary service.

Very truly yours,

G. RICHARD WYCKOFF, JR.,
Vice President.

STATEMENT OF THE WESTINGHOUSE ELECTRIC CORPORATION

SUMMARY

Energy to provide process heat, water heating and space heat for commercial and industrial establishments uses 25 percent of total U.S. consumption; and 76 percent of this is now supplied by oil and natural gas.

Commercial-industrial heat pumps have the potential for serving over 13 per cent of U.S. total energy consumption.

Commercial-industrial heat pumps are efficient users of energy, representing savings of 60 to 83 percent over electric resistance heating.

Heat pumps conserve scarce fuels, plus offering significant opportunities for shiting the use of energy from natural gas and oil to coal, hydro or nuclear-generated electric power . . . and ultimately to use of solar heat.

Heat pumps use waste heat and can reduce thermal pollution.

The proposed additional tax credit is recommended, and heat pumps should be included in the listing of approved energy conservation measures to motivate business consideration of the higher first-cost heat pump system.

Mr. Chairman, we appreciate the opportunity to present this written testimony to the Senate Committee on Finance regarding the National Energy Act of 1977. The testimony has been prepared by Mr. Richard C. Niess, representing the Westinghouse Electric Corporation's Heating and Cooling Business Unit, which is headquartered in Pittsburgh, Pennsylvania, and has manufacturing locations in Staunton, Virginia; Norman, Oklahoma and Elyria, Ohio. Mr. Niess' present assignment is Manager, Commercial-Industrial Templifier Heat Pump Department.

The Heating and Cooling Business Unit of the Westinghouse Electric Corporation manufactures heating and cooling products which serve residential, commercial and industrial markets. These Westinghouse products include electric cooling and heat pump systems as well as gas, oil and electric heating units.

The heat pump industry can be segmented into two major categories: large engineered systems and residential unitary equipment. We understand you have already received testimony on unitary heat pumps for residential and light commercial applications. These remarks are, therefore, directed to large engineered heat pump systems used for heating. Large heat pump systems are used for industrial and large commercial applications to provide process heating, service water heating and space heating.

The following statements outline the Westinghouse Electric Corportation's recommendations for the National Energy Act relative to large engineered heat pump systems.

Of the major end uses of energy by the commercial-industrial sector, just three functions—process heat, space heating and water heating—account for 45 percent of the energy used by this sector and 25 percent of total U.S. consumption.

Since 76 percent of the energy used in this sector by these three functions is now supplied by natural gas and oil, they offer an excellent opportunity to shift fuel use from oil and gas to electric power which can be coal, hydro or nuclear generated.

COMMERCIAL-INDUSTRIAL ENERGY USE BY END USE AND FUEL

[Percent of total United States]

Use	Coal	Natural gas	Oil	Subtotal direct	Purchased electricity	Total
Space heating [1]	1	2	3	6	1	7
Water heating [1]	(2)	1	(2)	1	(2)	1
Process heat [3]	3	9	4	17	(2)	17
Subtotal	4	12	7	24	1	25
All other uses [4]	3	6	6	15	16	31
Total (commercial-industrial)	7	18	13	39	17	56

[1] Can be generally served by heat pumps.
[2] Negligible.
[3] Can be partially served by heat pumps.
[4] Includes electric drive and generation, electrolytic process, direct heat, and feedstocks.

Note: Residential, 18 percent; transportation, 26 percent; total, United States, 100 percent.

Today, given economic incentive, large heat pumps can generally serve the needs of commercial-industrial space heating and water heating. For process heat applications, today's heat pump technology can efficiently serve most of the 14 percent of process heat used at or below 230° F. More advanced heat pump technology, currently being developed in cooperation with the Energy Research

and Development Administration, will raise this level up to 400° F, which serves an additional 16 percent of process heat needs, making a total of 30 percent of process heat that can be served by heat pumps.

Commercial-industrial heat pumps, therefore, have the potential for serving a total of over 13 percent of U.S. total consumption . . . the 8 percent used for space and water heating plus 30 percent of the 17 percent used for process heat.

Or, expressed another way, over 23 percent of the energy consumed by the commercial-industrial sector is utilized at temperatures which can be served by heat pumps.

However, up to now, gas and oil have been readily available to business at prices too low to provide the economic impetus for widespread heat pump application.

Process heat consumed by U.S. industry related to process temperatures required

Required process temperatures:	*Percent consumption*
230° F and below	14
231° F to 400° F	16
Over 400° F and steam drive	66
Electric generation	4
Total process heat consumption	100

The rising prices of oil and gas, as well as electricity, will direct more attention toward equipment that both efficiently uses energy and conserves energy. Conservation of gas and oil is of particular importance to save our declining reserves for those uses for which there is no substitute.

Government encouragement of the application of commercial-industrial heat pumps can extend the life of our reserves and reduce our oil imports through the increased use of electric power which will be increasingly generated by coal, hydro and nuclear energy.

LARGE ENGINEERED HEAT PUMP SYSTEMS

Large engineered heat pump systems employ the same basic heat pump principle as unitary heat pumps. Heat pumps do not produce or generate heat, but instead extract heat from one place and move it to another. By using larger compressors and working at generally higher temperature levels, industrial heat pumps can produce process, space or water heating for industrial and commercial applications. Our company has developed a heat pump which we call a Templifier™ (short for temperature amplifier) which can make wise use of energy by extracting the energy from waste streams of heated air or water which normally would be thrown away. They amplify the temperature of this heat by use of the vapor compression heat pump cycle and deliver useful heat. These sources include such waste heat as warm water effluent from plant processes, cooling water for air compressors, welders, injection molders and refrigeration equipment as well as cooling tower water and condenser cooling water from power plants.

For the commercial-industrial heat pump, these sources usually provide a much better waste heat source than outside air which in turn allows the heat pump to operate at its maximum efficiency while, at the same time, conserving scarce fuels and reducing thermal pollution. In some ways it is similar to co-generation in that it reuses BTU's previously generated and used so as to get more useful heat from the same amount of fuel.

The heat pump is efficient

Performance is highly efficient. For example, a heat pump extracts three units of heat from a waste stream, adds one unit of electric power to do the temperature amplifying and delivers four units of useful heat output. In this case, the measure of this heat pump's effectiveness, called coefficient of performance or COP, is four units of useful energy out divided by one unit of purchased energy in for a 4 COP. In this example, typical of a heat pump extracting waste heat from 90° F cooling tower water and delivering 150° F hot water for a plant process, there is a 75 percent saving over electric resistance heating.

Actual application coefficient of performance ranges from about 2.5 to 6.0, with the average commercial-industrial application running about 4.0 on projects with which we have been associated. This COP range represents savings of 60 percent to 83 percent over electric resistance heating.

The heat pump conserves scarce fuels

Scarce fuel is conserved two ways. First, the heat pump utilizes heat that would otherwise be wasted.

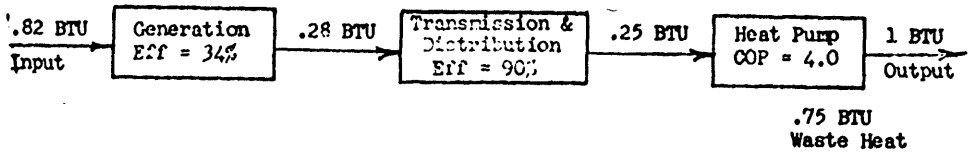
Second, the heat pump reduces the consumption of primary energy (tons of coal, gallons of oil, cubic feet of natural gas) for each unit of useful heat delivered to a commercial building or an industrial process. For example, a heat pump operating at a coefficient of performance of 4.0 requires only 0.25 units of heat input in the form of electric energy to deliver one unit of useful heat output . . . the remaining 0.75 units coming from a waste heat source.

Using the Federal Power Commission's figures on the average generation and the average transmission-and-distribution efficiencies of the electric utility industry, in the order of magnitude of 34 percent and 90 percent respectively, we find an input of only 0.82 units of primary energy required at the power plant to operate the heat pump.

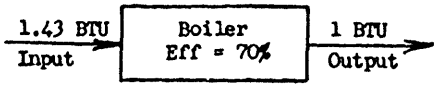
Compare this to a fossil-fired boiler operating at a seasonal efficiency of 70 percent. It consumes 1.43 units of primary energy to deliver one unit of useful heat output. In this example, 74 percent more primary energy is consumed than that required for a heat pump.

FUEL CONSERVATION

Heat Pump



Fuel Fired Boiler



If the electric power is oil or gas generated and the boiler is oil or gas fired, the primary energy saving is 0.61 units per unit of useful heat output.

If the electric power is coal, hydro or nuclear generated, 1.43 units of scarce oil or gas have been saved for each unit of useful output. As increasing amounts of electric powers are so generated, commercial-industrial heat pumps offer significant opportunities for conserving oil and natural gas and improving efficiency in the use of energy.

Therefore, business investments in commercial-industrial heat pumps should be considered a government approved conservation measure and should be given equal treatment with other approved conservation measures.

Heat pumps use waste heat

The National Energy Plan proposed by the President pointed out that waste heat in industry and electric generation was equivalent to over 7 million barrels of oil per day in 1975. We previously pointed out that the commercial-industrial heat pump achieved its efficiency by temperature amplifying waste heat from such sources. The Plan seeks to achieve the large savings available from productive use of waste heat through positive incentives. The heat pump is another way, along with co-generation and district heating, to achieve this objective.

Additionally, by productive use of waste heat instead of discharging it to the air or to our streams, thermal pollution can be reduced.

Heat pumps offer energy alternatives

The Plan proposes to prohibit industry from burning natural gas and petroleum products in new boilers. As coal is a viable alternative to only very large installations and electric boilers are expensive to operate, heat pumps offer a true energy alternative; and their use by industry should be encouraged. Smaller industrial plants need this additional option.

Heat pumps and solar energy for future savings

Further gains in efficiencies can be achieved by improving the input to the heat pump with solar collected heat. Solar collector efficiencies improve sharply at low fluid collection temperatures, and collection fluid temperatures fall as cloud cover increases and during all but peak summer days. However, these fluid temperatures are very suitable as input to an industrial heat pump for efficient temperature amplification up to the temperature required by the using process. Another variation is the solar pond—a man-made pond in the yard of an industrial plant—which collects heat from the sun which is then available as input to a heat pump. The solar pond may be the answer for the plant not having, or which is productively using, waste heat.

Tax credits

The Westinghouse Electric Corporation supports the proposed 10 percent tax credit (in addition to the existing investment tax credit) to encourage business to invest in energy saving products. Many devices such as regenerators, waste heat boilers, heat exchangers and heat pipes, are now specifically listed in the pending legislation. Most of these energy saving products are already on the market, but acceptance by industry is not nearly at its full potential. Tax credits will assist in gaining acceptance of these products by increasing the return on investment and by demonstrating the government's recognition of them as energy conservation measures.

We strongly recommend heat pumps be included in the listing in the proposed bill to provide the same beneficial market influences as now proposed for the other energy conservation measures. The proposed 10 percent tax credit, in our opinion, would be a significant factor to motivate business to appropriate additional capital for the higher first-cost heat pump system.

Incentives are needed

The first cost of an installed commercial-industrial heat pump is higher than that of a gas or oil boiler to produce the same amount of heat. Keep in mind that business firms have an incentive to make energy-saving investments that are cost effective only as the payback on these investments relate to other demand on their capital. In many cases, energy costs are small relative to the incremental investment in energy-saving measures. Therefore, we concur with the statement in the President's National Energy Plan that . . . "energy-saving investments frequently have a lower value to industry than to society."

The following table is typical of an industrial heat pump application compared to use of conventional boilers. As you can see, the proposed additional tax credit helps provide increased incentive for business to make the higher first cost investment by reducing the payback about 15 percent on new plants and 10 percent on retrofit.

TYPICAL EXAMPLE INDUSTRIAL HEAT PUMP VERSUS CONVENTIONAL BOILER

	New plant construction				Heat pump retrofit			
	Boiler				Boiler			
	Gas	Oil	Electric	Heat pump	Gas	Oil	Electric	Heat pump
1st cost:								
Equipment	$4,000	$4,000	$4,000	$16,000	(1)	(1)	(1)	$16,000
Installation	3,000	3,000	3,000	8,000	0	0	0	14,000
Total installed	7,000	7,000	7,000	24,000	0	0	0	30,000
Incremental 1st cost:								
Without additional tax credit				15,300				27,000
With additional tax credit				12,900				24,000
Annual energy cost	5,700	7,250	14,650	3,660	(2)	(2)	(2)	
Saving	2,040	3,590	10,990		2,040	3,590	10,990	
Heat pump payback (years):								
No tax credit	7.5	4.3	1.4		13.2	7.5	2.5	
With tax credit	6.3	3.6	1.2		11.8	6.7	2.2	

[1] Existing.
[2] Same as new plant.

Note: Westinghouse estimates: 1st cost based on dollar per million Btu per hour capacity. Heating cost per million Btu per hour process heat utilized 2,000 hr/yr (1 shift), 90° F waste heat source, 150° F process heat required, heat pump COP equals 4. Energy costs: Gas, $0.20 per therm (100,000 Btu); oil, $0.35 per gallon (138,000 Btu/gal.); electric, $0.025 per kilowatt-hour. Gas and oil boiler efficiency of 70 percent.

STATEMENT OF AIR PRODUCTS AND CHEMICALS, INC.

Air Products and Chemicals, Inc. believes that the Senate should clarify the provisions of the House bill granting tax credits and expand the assets eligible for credit.

Air Products and Chemicals, Inc. is a diversified producer of chemicals and other products. The Company is headquartered in Allentown, Pennsylvania. The Company is currently considering various projects involving the conversion of coal into feedstock gas and solid clean fuel.

I. CREDIT FOR INVESTMENT IN FACILITIES FOR PRODUCTION OF SYNTHETIC GAS

Air Products believe that the term "synthetic gas" as used in the House Bill Section 2051 definition of alternate energy property should be clarified.

The original administration proposal contemplated a tax incentive for investment in facilities to convert coal into feedstock for manufacture of chemicals or other products. The administration also proposed a tax incentive for conversion of coal into "synthetic gas" having a heat content of 500 Btu's or less per standard cubic foot. In defining the facilities eligible for the tax incentive, the original Administration proposal provided in part:

"(C) a facility for the conversion of coal into synthetic gas which has a heat content of 500 British thermal units or less per standard cubic foot.

"(D) a facility where coal is used as a feedstock for manufacture of chemicals or other products (other than coke),

"(E) equipment used for the unloading, transfer, storage, or preparation (including washing, crushing, drying and weighing at the point of use) of coal for use in, or with respect to . . . facility described in subparagraph . . . (C), or (D)."

The House Bill grants a credit against the user tax or, in the alternative, a supplemental investment tax credit with respect to investment in: "Equipment for converting an alternate substance into synthetic gas."

This provision is contained in proposed new Internal Revenue Code Section 4998 which defines alternate energy property for purposes of the credit. The definition of alternate energy property in the House Bill does not, however, include a separate reference to equipment used for the conversion of coal into chemical feedstock. On the other hand, the House Bill does not contain a restriction on the Btu content of synthetic gas.

Meaning of "synthetic gas"

The term "synthetic gas" does not have an accepted commercial or technical meaning. The term could be interpreted as including all gas produced from coal regardless of whether the gas is to be utilized as a fuel or a building block feedstock for further processing. However, subparagraph (F) of proposed Internal Revenue Code Section 4998(b)(1), which defines additional items to be treated as alternate energy property, in effect includes coal handling equipment used in connection with equipment for converting an alternate substance into gas and separately, in subdivision (ii), coal handling equipment to be used in connection with a facility in which coal is used "as a feedstock for the manufacture of chemicals or other products. . . ."

This provision dealing with coal handling equipment leaves a question as to whether the term "synthetic gas" is limited to gas destined for use as other than chemical feedstock.

Air Products is not aware of any existing plant located in the United States which produces gas from an alternate substance in any economically important quantity regardless of whether the gas is destined for use as a fuel or a chemical feedstock and as a result the term synthetic gas has yet to take on an accepted meaning. There would appear to be no economic, energy or tax policy reason to hold that the term is intended to differentiate between a plant to produce gas from coal for use as a fuel and a plant to produce gas from coal for use as a feedstock.

The fact that in defining facilities eligible for the credit, the House Bill eliminated any separate references to equipment for converting coal to a chemical feedstock and eliminated the Btu limitation on synthetic gas, is consistent with an interpretation that synthetic gas includes gas destined for feedstock use as well as for fuel use. Under this interpretation, the remaining separate reference in subparagraph (F)(ii) of proposed new Code Section 4998 to coal handling equipment used in connection with a "facility which uses coal as a feedstock for

the manufacture of chemicals . . ." may either have been an oversight or have been intended as a broader category, solely for that limited purpose than the category of equipment for converting coal into a gas destined either for use as a fuel or for use as a chemical feedstock.

Processes for gasification into fuel and feedstock are similar

To Air Products' knowledge, the technology and processes involved in presently planned commercial scale plants for the conversion of coal to gas for fuel or feedstock is essentially the same through the gasification clean-up and separation stage.

In both situations, the gasification involves a chemical reaction in which molecular structure is changed. At the point of gasification, reflecting technology involved in all presently planned commercial scale plants, no significant difference in the nature of the gasified coal exists regardless of whether the intent is to produce fuel or feedstock. In both cases, the clean-up and separation of the gasified coal into its important economic elements involves a physical separation as opposed to a chemical reaction. In the case of production of feedstock and in most cases of production of a fuel, a further chemical reaction is involved in order to obtain the desired mixture of commercially marketable gas.

In the case of the conversion of the coal to a fuel, dependent on its intended use after the clean-up, it is also necessary to methanate the gas which involves a chemical reaction. It is also true that in the case of feedstocks destined for certain chemical uses methanation would be involved. This is required, for example, if ammonia is to be produced from the feedstock.

Incentive needed for both fuel and feedstock

The national purpose of encouraging the utilization of alternate energy substances is served equally well by facilities which would convert coal, shale and other substances into a fuel or into a feedstock in lieu of fuel or feedstock derived from oil and natural gas. For example, Air Products is currently considering an investment in a plant that would convert coal into hydrogen and carbon monoxide to be used as chemical feedstocks. The facility, over a projected 15 year life, would displace and permit to be used for other energy purposes, an estimated 90 billion SCF of natural gas.

In fact, there would seem to be no policy reason to restrict the incentive to gas derived from alternate substances as opposed to liquid fuel or feedstock derived from alternate substances.

The problem is one of getting started. It is generally accepted that fuel or feedstocks derived from coal gasification are not now competitive with those derived from oil and natural gas which means that government incentives are needed to trigger commercial development which should lead to new advanced economic coal gasification technology.

Currently, Air Products, as well as other companies, produce hydrogen and carbon monoxide through steam reforming of natural gas. Some others produce these products through refinement of oil. Studies by Air Products and others indicate that reflecting existing technology the sales price of hydrogen and carbon monoxide derived from coal would have to be in the range of 1.5 to 2 times that of hydrogen and carbon monoxide derived from natural gas.

The capital investment in a coal conversion plant that would approach being competitive with oil and natural gas is very high and the risk of rapid technological obsolescence exists.

Given the high cost of production, the large investment and the high risk of obsolescence, it is unlikely that early commercial production in significant quantities will occur without substantial government incentives. Industry needs government financial assistance to go to commercial development now. Commercial development will accelerate the day that coal can be used as a full economic replacement for oil and natural gas. We believe that commercial development will provide the needed impetus to the development of new and improved technology for the conversion of coal which will evenually eliminate that need for government-provided incentives.

Further clarification

Further clarification of the House Bill is required as to the plant investment considered to be utilized in the production of synthetic gas. All known commercially feasible processes involve gasification of the coal at the front end of the plant. Thereafter, additional processing is required to remove impurities

which could not be retained in the gas regardless of whether it was used as a fuel or as a feedstock and to separate the desired elements. The gas, after it comes out of the gasification portion of the plant, would not generally be marketable either as a fuel or as a feedstock. Potential customers would require cleaning and separation of the gas into the usable fuel or feedstock. Carbon monoxide gas could be subject to further processing so as to obtain the desired relative quantities of carbon monoxide and hydrogen. This is commonly referred to as "shift".

The statute should be clarified to ensure that investment required for clean up, separation and shift of the gasified coal into its usable elements in generally marketable condition and quantities, is eligible for credit.

Proposed language

It is recommended that Section 4998(b)(i)(D) be amended to read as follows:

"(D) equipment (including necessary on-site piping and support equipment) for converting an alternate substance into a gas which is generally marketable without further refinement as a fuel or a feedstock."

The suggested language relating to general marketability and the need for no further refinement is intended to restrict the credit to investments required to gasify, eliminate impurities and to separate the gas into its economically usable elements. The intent is to limit the credit to the investment needed to produce marketable feedstock from the gasification of coal and not to include investment in down stream facilities in which such feedstocks would be subject to further processing into other products.

II. ADDITIONAL DRAFTING CLARIFICATION

Two drafting problems need to be corrected. First, it should be made clear that coal as referred to in House Bill Section 2051 also includes lignite since for other purposes in the Internal Revenue Code they are separate. Second, it should be made clear that for purposes of the 10 percent investment tax credit, a coal gasification plant does not have to be used on an "integral part of, or used in connection with, a building or other structure. . . ." Such a plant is, itself, a structure. The restricting "structure" language is contained in House Bill Section 2061 which includes proposed new subsection (1)(2)(B) of Section 48 of the Internal Revenue Code. This requirement of subparagraph (B) of proposed Section 48 (1)(2)(B) would also seem to be inconsistent with subparagraph (A)(v) of Section 48(1)(2) which deals with recycling equipment.

III. POLLUTION CONTROL EQUIPMENT AS ALTERNATE ENERGY PROPERTY

The House Bill includes as a definition of alternate energy property eligible for the credit against the user tax and, in the alternative, the additional investment credit:

"(E) Pollution control equipment required (by federal, state, or local regulations) to be installed on or in connection with equipment described in subparagraph (A), (B), or (D)."

The subparagraph references are to boilers and burners for a combustor using alternate substances as well as equipment for converting an alternate substance into synthetic gas.

Subparagraph (E) could be interpreted to be restricted to pollution control devices installed on or near a specific boiler, burner or plant and which are associated with the combustion of the alternate substance. We believe that this language should be modified to clearly spell out that "pollution control equipment" includes investment in facilities designed to remove pollutants from an alternate substance before use as a fuel.

Specifically, various companies including Air Products are giving consideration to commercial scale solvent refining of coal. This involves a process in which coal is liquefied for the purpose of removal of pollutants, principally sulfur and ash, and the recombining of the coal into a solid form which can be used directly as a solid fuel or liquefied or gasified for use as a fuel.

There is some dispute in the competitive marketplace as to whether the solvent refined coal process is as economical in removing pollutants as competing coal stack removal processes which are used to control pollution after combustion has occurred. It is clear, however, that solvent refining of coal is at least approaching competitiveness with stack removal. Further, the recom-

bined coal created through the solvent refining of coal can be used directly to replace low sulfur number six residual oil as a fuel for existing boilers with relatively modest modifications to the existing boiler. Untreated coal could not be used in these boilers.

Significant research and development effort is currently being made to devise other means of chemical pretreatment of coal to remove pollutants. It is generally anticipated that these efforts will eventually result in a significant improvement in the economics of removing the pollutants over that now involved in stack removal after combustion has occurred. It is simpler to pretreat the relatively small volume of coal over the enormous volume which must be treated as gas as it is emitted after combustion. The development of more economical pretreatment of coal will obviously encourage the substitution of coal for oil and natural gas.

Here again, the problem is one of getting started. The lead time is significant. Industry needs government incentives to proceed to early commercial application of these pollution control methods. In addition to accelerating the point of time the coal becomes competitive, early commercial development is desirable to avoid the economic waste involved in major investments in stack removal of pollutants that are now contemplated under existing law. It is expected that these stack removal processes will be rendered economically obsolete long before their physical useful life has expired.

To insure the qualification of facilities that remove the pollutants prior to use in the combustion process it is recommended that subparagraph (E) of Section 4998(b)(1) be modified to read as follows:

"(E) Pollution control equipment to be installed on or in connection with equipment described in (A), (B), or (D) including a facility to remove pollutants from an alternate substance prior to its use or sale or use in equipment described in subparagraphs (A), (B), or (D) provided that federal, state, or local law requires the control of pollutants contained in the alternate substance."

There would seem to be no policy or technical tax administration reason for restricting the credit only to facilities used to remove pollutants afer combustion or other processing. If coal could be used as an energy-providing substance without concern as to its effect on the environment this country would not have as severe an energy problem. Incentives to encourage new development and investment in facilities to more economically eliminate pollutants from coal therefore are consistent with the overall objective to switch reliance on natural gas and oil to coal and other substances.

If coal is to be given wider use, we must find ways of removing the pollutants contained in coal. Congress should not be in the position of favoring through tax incentives one method over the other. The method to be employed should be decided in the marketplace.

IV. QUALIFYING PERIOD FOR BUSINESS ENERGY CREDIT

The House Bill would grant an option to claim an additional 10 percent investment tax credit in lieu of the credit against use tax for investments in qualifying property. Under the House Bill the alternative additional investment credit would be available only for investments made between April 19, 1977 and before January 1, 1983.

The lead time involved in reaching the decision to build and to actually construct a coal conversion plant is substantial. The construction phase could take as long as five years. It is suggested that investments made pursuant to construction commenced prior to January 1, 1983 be eligible for credit even though the expenditure is made thereafter.

V. DEPRECIATION OF COAL CONVERSION EQUIPMENT

Once commercial conversion of coal into gas liquid or solids becomes economically feasible, it can be expected that there will be rapid development of technology which will render the early plants technically and economically obsolete. This expectation is a deterrent to current investment in facilities designed to convert coal and other alternate substances into a liquid or gaseous substance similar to those derived from oil or natural gas.

The construction period of coal conversion plants is expected to range from 3–5 years from the time ground is broken. It is suggested the Congress permit depreciation of plants of this type over a 5-year life employing a double declin-

ing balance method of depreciation with the depreciation to commence as expenditure is made, as opposed to the time the plant starts up. This accelerated depreciation should be granted without a reduction in related investment tax credit.

VI. FUNDING OF NEW DEVELOPMENTS

Presuming Congress enacts the crude oil equalization tax and the excise tax on business use of oil and natural gas, it would seem advisable to set aside a portion of the funds collected to encourage the development of alternate energy sources rather than to flow the funds back into the economy in the form of rebates. This encouragement could take many forms including direct subsidies, tax incentives or loans to finance facilities. Use of the funds in this manner would be consistent with the overall objective of the national energy policy.

VII. DISCRIMINATORY TREATMENT OF COMPETING PROCESSES FOR ENHANCED PETROLEUM RECOVERY

There are competing techniques in the enhanced recovery of scarce petroleum resources through the use of inert gas. One system for inert gas production involves the burning of natural gas in an engine driving a compressor and the utilization of the resulting gas for injection in the well. A competing system is the injection of nitrogen which is produced through a cryogenic process involving the extraction of nitrogen from the atmosphere. The primary "raw material", representing approximately 50 percent of the cost, is electricity. Under the existing Bill, the first process involving the burning of natural gas will be favored as the natural gas so used will be exempt from tax. The producer of the electricity will not obtain an exemption.

The combustion of 1 cu. ft. of natural gas in an inert gas generator will produce only 5 to 8 cu. ft. of inert gas at a pressure of 3,000 psi, while burning the same cubic foot of gas in a power station will generate sufficient electricity to produce over 10 cu. ft. of pure nitrogen at 3,000 psi when the cryogenic process is used.

It would seem clear that the pending legislation should not contain an incentive for the consumption of natural gas to the detriment of a process which involves consumption of less energy.

Perhaps, a concept similar to that employed in proposed Code Section 499S (c)(4) of the House Bill could be adopted to grant relief to the user company which elects a nitrogen process.

PACIFIC GAS & ELECTRIC CO.,
San Francisco, Calif., September 9, 1977.

Hon. RUSSELL B. LONG,
Chairman, Committee on Finance,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: As the Finance Committee proceeds with its deliberations on the tax provisions of the proposed National Energy Act (Title II, H.R. 8444), we ask that you and the Members of the Committee consider the unique position of California consumers in regard to the oil and gas use tax.

Pacific Gas and Electric Company serves electric energy in an area of 94,000 square miles of Northern and Central California with a population of 8.7 million. Over 50 percent of our electric generating capacity is oil and gas fired (7.7 million kilowatts). The balance (6.7 million kilowatts) is hydroelectric, geothermal, and nuclear capacity. California has no coal in commercial quantities.

It is not feasible to convert to the use of coal for a variety of reasons: technological, environmental, unavailability of coal or adequate transportation facilities, physical site limitations which make the addition of coal handling facilities impossible and economic restrictions.

The oil and gas use tax now before you makes no allowances for this situation in California. Some exemption from the tax is permitted where coal cannot be burned because of environmental restrictions, but none is provided for where other factors, such as those mentioned above, prevent the burning of coal. As a result, the consumers of California will be required to pay a multi-million dollar tax penalty in their electric bills through no fault of their own. Such a tax is obviously discriminatory as to the citizens of California and an unfair burden on our customers.

Under the coal conversion provisions of S. 977, recently approved by the Senate, existing oil and gas generating facilities can be excused from converting to coal where restrictions such as I have outlined above are present. The tax provisions of H.R. 8444 ignore this fact, however, and impose the tax even though the use of oil or gas is authorized under S. 977.

We believe that the oil and gas use tax is unwise and should be deleted in its entirety for reasons given by others who have appeared before your Committee. However, if the Senate decides not to delete it, we urge that the Senate at least add to the taxing provisions an exemption from the tax in any case where conversion from the use of oil and gas is exempt under the coal conversion provisions under S. 977.

I respectfully request that this letter be made a part of the record before your Committee.

Sincerely,

JOHN F. BONNER.

STATEMENT OF THE COMMITTEE FOR TAX INCENTIVES TO ENCOURAGE RENEWABLE RESOURCE USE

This statement is being submitted for the record by the Committee for Tax Incentives to Encourage Renewable Resource Use, which was formed to seek the expansion of those sections of the Administration's energy policy legislation granting incentives for conversion to coal, to include the use of renewable resources (primarily agricultural by-products and waste, and wood products) as alternative fuels and feedstocks.

Members of our Committee believe that these sources contain sufficient releasable energy to have a significant impact on America's energy supply in the future. Much of the technology which is being considered or can be developed will be brought to fruition far more quickly if there are adequate and appropriate incentives for its use.

The potential for renewable resources as an energy source is becoming widely recognized. At present, there are numerous programs investigating the feasibility of using these materials for energy applications, such as direct process and space heating use, and as a feedstock for gasification. These materials would produce cheaper fuel supplies, would use renewable material which is presently treated as waste or a low-value by-product, and would extend the life of the world's nonrenewable resources, particularly natural gas and petroleum, but also coal. Use of these energy sources might in many cases solve environmental problems (such as the disposition of solid waste) and avoid the strip mining, air pollution and water consumption problems connected with the direct use or gasification of coal. Further, in most cases these waste products would be available at the location where they are to be utilized, so they would not require transportation, wtih its attendant cost and use of energy.

At the moment, transformation of waste and by-products into low BTU gas appears to be the preferred industrial method of utilization, since the process is relatively clean and the fuel produced is more versatile. The gas, for example, can be used as fuel both for direct drying ovens and for engines which can run a pump or electrical generator. The technology is known (among other things it powered some 700,000 motor vehicles in Western Europe during World War II), but has never been commercially developed in the United States due to the availability of cheaper, more convenient fuels. Now it is under active development, and will probably be available in the market in approximately two to three years. It is estimated that a low-BTU gasifier with feeding equipment, sized to produce 1,000,000 BTU's per hour (the equivalent of a thousand cubic feet of natural gas) might cost approximately $25,000–$35,000 on a mass-produced basis.

There are now at least four specific programs under development where tax incentives could materially advance the use of these renewable fuels, as well as at least one general area where use of renewable feedstocks is being investigated. The specific areas are the use of corn cobs and stalks as a feedstock for gasification into low-BTU gas which would be used to fuel seed-drying ovens; the use of so-called "ginning trash" (cotton stalks, leaves and other trash picked up in the cotton bale and separated out in the cotton-ginning process) which would be used initially for direct heat to dry cotton, but perhaps ultimately could be gasified to run cotton gin equipment; use of corn and wheat waste as feedstock for gasification into low-BTU gas to drive farm irrigation pumps in many areas of the

United States; and use of almond shells as a feedstock for almond processing. The more general area is the use of wood (including waste and cut timber) for space heating, process heating and gasification. Many more applications might emerge if appropriate incentives are given to the industries in question.

We are pleased that the Endorse House of Representatives recognized this potential source of substitute energy in H.R. 84444, broadening Sec. 2051, the credit against the industrial users tax, and Sec. 2061, the Business Energy Credit, to include investment made to convert to, or install, facilities using bio-mass as an energy source.

However, the Committee would make the following suggestions with respect to the bill as passed by the House of Representatives:

(a) Page 454, lines 7-8—In Section 4998(b)(1)(F), the parenthetical clause should include such preparation steps as shredding, chopping, pulverizing, grinding, screening and sorting. These are steps which might be necessary for the preparation of bio-mass, although not for coal (the fuel for which the paragraph was originally drafted), and it is believed they were omitted inadvertently.

(b) Page 471, line 18: Page 472, line 7—In section 2061 (b), either the definition of "cogeneration property" ((1)(3)) or "specially defined energy property ((1)(5)) should be expanded to include equipment which is used to produce steam, heat or other forms of useful energy, and then do some other form of work. This, for example, would encompass the situation when equipment is used to produce drying heat, and the excess heat is used to drive a fan to circulate the drying heat. Acknowledgement of this could be accomplished by expanding the definition of "cogeneration" to include the production of "motive" energy, rather than being limited to "electric" energy. An alternative method of accomplishing this same purpose would be to expand section (5) to include, as item (L), "a secondary heat recovery system," relettering present "L" as "M" and then expanding the balance of the paragraph to read "the principal purpose of which is reducing the amount of energy consumed or increasing the amount of useful work done by a given amount of energy in any existing industrial or commercial process. . ." Increasing the work performed is as conserving of energy as is reducing fuel consumed, and should be so recognized.

With these two minor amendments, one of which is merely technical and the second of which is clearly within the intent of the legislation, the Committee for Tax Incentives to Encourage Renewable Resource Use supports the legislation as passed by the House of Representatives and urges it being favorably reported to the Senate floor by your Committee.

ATTACHMENT A

Four specific applications alone could save billions of cubic feet of natural gas (or its equivalent in barrels of oil) each year, based on the following projections of releasable energy from agricultural by-products and wastes:

Cobs (for drying) 2.8 bcf (.5 million bbl oil equivalent). Cotton trash 2.8 bcf (.5 million bbl oil equivalent). Irrigation (high cost applications) 130.0 bcf (23 million bbl oil equivalent). Almond shells .8 bcf (.14 million bbl oil equivalent).

To put the total savings from these sources in some perspective, the city of Washington, D.C., in 1975 required 24.8 bcf to supply all of the needs of its residents, while residential usage for all of New England was 133.5 bcf. Thus. known potential applications could fuel five Washingtons or all of the residential customers in New England for a year. More importantly, this list is by no means an exhaustive catalogue of the applications where renewable waste or by-products materials might be used to replace the combustion or other utilization of nonrenewable fuel supplies.

Use of Cobs for Drying Seed Corn

About 25,000,000 bushels of hybrid seed corn are produced annually in the United States and accounts for 99 percent of the U.S. production of approximately six billion bushels of corn each year. In terms of bushels, commercial corn is the largest grain crop produced in the United States by a factor of three.

Hybrid corn represents one of the real advances in agriculture developed in America, since the corn produced is hardier and has substantially higher yields than corn from conventional seed; however, since it is hybrid, it cannot re-

produce itself satisfactorily and accordingly the seed must be produced in substantial quantities by special processors, of which there are approximately 200 in the United States.

Corn producing hybrid seed ripens in the early fall. The ears must be picked and the kernels dried to a moisture level of 11 percent from 30 percent before the ear has a chance to freeze, which would kill the germ. Excessive heat for drying can also kill the germ; 110 degrees Farenheit is the ideal temperature. Drying is accomplished in large buildings having holding bins in which a heated air stream is carefully controlled as it passes through to effect drying. It requires approximately 140,000 BTUs of heat to dry cobs containing a bushel of seed corn to the required moisture level.

At present, this heat is primarily provided by burning natural gas, supplemented when necessary by propane. Fuel oil can also be used, as can (in theory) any other source of heat which permits temperature adjustment and does not result in the spread of particulates or products of combustion.

Various seed producers have been experimenting with the use of corn cobs as a fuel for the drying process. The cobs from a ton of seed corn have a recoverable energy content of approximately 14,000,000 BTUs, or approximately enough to dry the very seed that they grow. Thus, a year's fuel requirement could be largely provided by concurrent by-products.

In some areas, cobs can be sold for prices ranging between $4 and $10 per ton for use in certain industrial processes, as furfural, carriers of chemicals, polishing agents and feed fillers. However there is an abundant supply of cobs to meet all of these needs. A much higher form value use for a ton of cobs is the replacement of non-renewable resources, either through direct combustion or gasification. At the present time, neither the technical nor the economic feasibility of any of these processes has been firmly established; none of them have been perfected to the point where they could be relied on. However, to the extent that they can be perfected and employed, they will permit one of America's most vital and fundamental (although relatively small) industries to continue to function, while minimizing its use of nonrenewable resources, by drying the seed corn ears with heat derived from equal quantities of cobs available from the seed production.

Use of "Ginning Trash" in Cotton Processing

Present domestic cotton production is approximately ten to thirteen million bales per year. Each cotton bale contains approximately 150 to 200 pounds of so-called "ginning trash" (whihc includes stems, leaves, and pods of cotton and various other field debris) which is removed in the ginning process. According to the U.S. Cotton Ginning Research Laboratory, Stoneville, Mississippi, this "trash" can release from 7,000 to 8,000 BTUs per pound.

At the present time, the ginning industry uses primarily natural gas or liquid petroleum gas to dry the raw cotton. This is an essential step before ginning. As a result of last winter's interruptions of natural gas, ginners began experimenting with the use of "trash" in direct firing heat exchangers. However, substantial technical problems have been encountered, primarily with the residue from combustion; further, this application does not require as much heat as the "trash" is capable of generating. As a result, the ginning industry is also considering gasification of this waste product with some of the gas being used for process heat, and the balance of the gas being used to generate the electricity needed for the ginning facility. It is estimated by Stanford Research Institute that in this manner a cotton gin could become virtually self-sufficient as far as energy is concerned.

In the past, this "trash" was returned to the fields and plowed back in by the cotton farmers; however, at present hauling and related costs make this unfeasible. Various other possible uses of disposition are precluded by Federal regulations. Utilizing it as a gasification feedstock would accordingly also solve a solid waste disposal problem.

Gasification of harvest waste for irrigation

Irrigation from deep wells is one of the major uses of energy in agriculture, requiring fuel for the pumps which bring the water to the surface and distribute it through sprinklers over the fields. In 1974, irrigation required the use of natural gas, propane, diesel fuel and electricity having the energy equivalent of 261 bcf of natural gas. On many farms, the corn stalks, wheat straw, or animal waste produced on the farm could be gasified to reproduce the fuel necessary for this

operation. On many of these farms, if no irrigation were provided, there would be virtually no crops produced and the land would become almost valueless.

Approximately 9 percent of the U.S. corn crop (or 600 million bushels) is grown on irrigated land, as are substantial amounts of wheat and other crops. Farmers are concerned with the rising cost and declining availability of conventional fuels, and the use of gasifiers for these applications is under active investigation. Since irrigated corn yields 40 or 50 percent above the national average on a per-acre basis, maintenance and expansion of irrigated crops also reduces the amount of energy used in operating tilling equipment, presently the largest component of agricultural energy use.

One major producer of corn has indicated that his fuel costs for natural gas for a 296-acre farm in northwest Kansas rose from $3391 in 1974 to $6426 in 1976, while his yields remained the same. He estimates fuel is now costing over 13 cents a bushel, or approximately 7 percent of the average 1977 corn price. Another farmer in the same area reports fuel costs for irrigation almost doubling from 1975 to 1976. These costs could be substantially reduced by use of gasifiers; more importantly, a more reliable supply would be established.

Almond and other nutshells for process use

Almond processing, which is carried on primarily in California, uses electricity and natural gas as the fuels for shelling, drying and roasting almonds. The largest almond processor, which accounts for approximately 60 percent of U.S. production, uses 562,000 therms of energy a year, and estimates that the almond shells which it produces as a by-product have the potential to release 5,250,000 therms of energy (the equivalent of 525,000 mcf of natural gas). For the whole industry, this would indicate a capacity of approximately .8 bcf. Preliminary studies have indicated that the most feasible use of these almond shells will be gasification, with the gas then used for process heat and to generate electricity. This conclusion is based primarily on concerns about air pollution from direct combustion of the shells. Similar processes are presently being investigated by walnut growers, and may be usable by certain peanut processors. At present, these shells have a very low value for use as mulches, industrial fillers, and surfacing materials.

Lumber and Lumbering Waste

According to the Institute of Gas Technology, wood and wood wastes account for almost one half of the total bio-mass produced on the earth; the 116,000,000 dry tons of forestry waste that are generated annually in the United States by logging and wood manufacturing operations contain an estimated amount of energy equal to two trillion cubic feet of natural gas (approximately 10 percent of the United States natural gas usage). Wood presently is being used as a boiler fuel—the pending ERDA appropriations bill contains authority for the Administrator to guarantee a loan or loans for a 50 MW electrical generating facility in Vermont which would use boilers fueled exclusively by wood.

Similarly, some wood is being used for space heating and direct process heat in furniture and similar factories, according to the Vermont State Energy Office. IGT has indicated that wood and timbering waste is a feasible stock for gasification.

Other Materials

It has been estimated that each person in the United States produces an average of ten pounds of household, commercial and industrial refuse each day, and that this refuse has a heating value of approximately 5,000 BTUs per pound. Similarly, there are other agricultural processes, such as sugar cane production, which create substantial amounts of by-products or waste (sugar cane waste is currently being used in Hawaii to generate electricity).

STATEMENT OF THE MOTOR VEHICLE MANUFACTURERS ASSOCIATION OF THE UNITED STATES, INC.

The Motor Vehicle Manufacturers Association of the United States, Inc. (MVMA) welcomes the opportunity to submit this statement on S. 1472, "A Bill to Implement the Tax Aspects of the Comprehensive National Energy Policy" on behalf of the following members of the Association: American Motors Corpo-

ration; Checker Motors Corporation; Chrysler Corporation; General Motors Corporation; International Harvester Company; PACCAR, Inc.; Walter Motor Truck Company; Warner and Swasey Company, Badger Division; and White Motor Company.

Part B, Subpart 2—Gasoline Conservation Program

MVMA supports the use of the price mechanism to promote gasoline conservation. Gasoline price and allocation decontrol, as proposed by the Federal Energy Administration on August 12, 1977, would be an important first step toward pricing gasoline at its true resource value and thereby encouraging conservation. Until such decontrol occurs, however, it is premature to consider implementing a system of gasoline consumption targets and taxes such as those proposed in the National Energy Act.

Part B, Subpart 4—Removal of Excise Tax on Buses

MVMA supports the proposed repeal of the remaining 10% excise tax on intercity buses. Eliminiation of this tax would make more capital available to the new bus purchaser and could, as a result, stimulate demand for more fuel efficient diesel engines and other energy saving vehicle equipment.

Part C—Business Energy Tax Credit

MVMA supports the proposed business investment tax credits as an appropriate incentive to industry to make energy efficiency capital improvements. Given the long lead times (often several years) necessary to procure, install, test and adjust coal conversion equipment and related mandatory emissions control devices, however, we question the legislation's requirement that such property be "placed in service" before January 1, 1983. This five year time frame may be insufficient in many cases to reach fully operational service—particularly given the anticipated increase in demand for coal conversion facilities and related emissions controls as a result of mandatory coal conversion orders under the authority of the Energy Supply and Environmental Coordination Act of 1974 (as amended) and other governmental policies.

It is suggested, therefore, that the time frame for having eligible investments "placed in service" be extended from the currently proposed deadline of January 1, 1983 to the more realistic date of January 1, 1985.

Part D—Crude oil tax

MVMA views the proposed taxes on crude oil and per capita rebates of the derived revenues as inefficient means of achieving the goal of reduced petroleum consumption. They are inefficient, because, when combined with a continuation of price controls on crude oil, they constitute a poor "proxy price" for either the "resource replacement cost" or the "world market price" of petroleum.

Price decontrol, on the other hand, would allow petroleum prices to rise to their "resource replacement cost" through the operation of the market forces. Although it is recognized that the "world market price" is substantially controlled by the actions of the OPEC cartel, any resultant excessive price increases can be dealt with through a windfall profits tax. Another important advantage of the price decontrol approach (with or without a windfall profits tax) is that it addresses both sides of the supply/demand equation, whereas a crude oil tax alone does nothing to stimulate petroleum supplies; indeed, unless very carefully constructed, a crude oil tax may significantly reduce domestic petroleum supplies by making new exploration and production uneconomic. Decontrol, on the other hand, would offer double benefits in that users would be encouraged to conserve while producers would have the incentive to explore for and to develop new supplies.

It is also questionable whether the proposed per capita rebates of the crude oil taxes collected is a desirable policy. Fixed per capita rebates would amount to a transfer of wealth from industrial energy users (who would receive no crude oil tax rebates) to individual citizens. While it can be argued that these rebates would cushion consumers from the inevitable price increases that would accompany the rise in the cost of energy to industry, this additional income would be unlikely to have a salutary effect on individuals' energy consumption and might actually stimulate energy demand if used for travel or other energy intensive purposes. The proposal to rebate crude oil tax revenues to residential fuel oil users is particularly ill-conceived, for it would serve as a direct disincentive to oil conservation, particularly when combined with per capita rebates.

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Part E—Oil and gas consumption taxes (and rebate)

MVMA opposes the proposed taxes on the industrial use of oil and natural gas on several fundamental grounds.

First, the proposal substitutes user taxes for price decontrol as the mechanism for balancing the Btu costs of petroleum products and natural gas. Price decontrol would achieve the same goal with the added bonus of making additional revenues available to producers for increased exploration and production. Decontrol would also avoid the difficulties, inherent in the user tax proposal, of having to fine tune taxes to achieve the desired parity of Btu costs.

Second, the user tax program fails to distinguish between the use of oil and gas as boiler fuels versus their use as process fuels. In many industrial processes (of which glass making is a classic example) there is presently no substitute for a clean burning fuel such as natural gas or propane. Users of such process fuels will therefore be penalized by the proposed taxes for being necessarily dependent on a particular industrial technology. The net result can only be rising manufacturing costs and accompanying inflation.

Third, the proposed threshold of 500 billion Btus energy use per year, at which point industrial use taxes would begin, implies, without justification, that firms using less than 500 billion Btus have either fewer opportunities to shift away from oil and natural gas or are otherwise entitled to "special treatment" akin to the proposed "lifeline" electric utility rates for residential consumers. Without debating the merits and demerits of the "lifeline" concept for residences, there appears to be little rationale for extending it to industrial energy users.

Fourth, the industrial energy use tax/rebate program is redundant with the proposed crude oil tax/rebate program. Industrial middle distillates, for example, would be taxed twice: once on the distillate portion of the crude oil and again when put to an industrial use. Such double taxation is clearly discriminatory against large industrial energy users, as contrasted with home heating oil users; diesel fuel users; and commercial and industrial oil use of less than 500 billion Btus per year—all of which would be taxed only once (through the crude oil tax). These double taxes could place the U.S. motor vehicle industry at a substantial competitive disadvantage *vis a vis* foreign manufacturers, because, while both U.S. and foreign manufacturers would ultimately be paying world crude oil prices, U.S. firms would also be incurring the additional industrial oil use tax.

Fifth, despite the proposed rebates of user taxes for business investments in coal conversion equipment and related pollution control device, the program is likely to have a substantial inflationary impact. At a minimum, prices for coal conversion equipment and accompanying pollution controls, which are already in high demand and short supply, are bound to skyrocket. Also, for industries shifting from natural gas to coal, rebates may be small to nonexistent because allocation of the higher prices of new natural gas to industrial users (as set forth in Part D of S. 1469, Title I of the proposed "National Energy Act") will increase the Btu equivalent price of industrial natural gas, thereby reducing both industrial use taxes and rebates (which are based only on use taxes paid, not on both use taxes and the allocated higher cost of new natural gas).

In all, therefore, the proposed industrial energy use tax/rebate program is ill-conceived, inherently ineffective, and discriminatory within the same class of users. We urge its deletion, in its entirety, from any ultmate legislation.

STATEMENT OF JEFF A. SCHNEPPER, RUTGERS COLLEGE, NEW BRUNSWICK, N.J.

AN ENERGY CRISIS SOLUTION

In the first quarter of 1977, the United States recorded a $6.9 billion trade deficit. During the first half of 1977, the United States merchandise trade deficit, on a balance of payment basis, reached a record high of $14.8 billion—a $30 billion annual rate.

In 1976 our deficit was only $9.2 billion over the whole year. In 1975 we experienced a $9.0 billion surplus. The reason for this massive deficit deterioration is not the erosion of U.S. trade competitiveness nor is it an indication of a basic weakness in the dollar in international currency markets. Rather, it represents the cost of the continuing swift rise in oil imports, to more than $40 billion this year. In fact, except for oil, the U.S. is in a trade surplus.

Over the last two years, the volume of U.S. oil imports has increased by a factor of two-thirds. In value terms, one half the swing in the trade balance of the past two years may be accounted for by the $19 billion increase in oil imports. The United States which, in 1948, was a net exporter of oil and dominated the world markets even more than Saudi Arabia does today, is currently facing a critical energy crisis.

In response to this challenge President Carter has developed a program targeted to cut imports of oil to six million barrels a day by 1985 compared with the present 7.5 million daily demand. Carter's plan though, attacks the problem with only one blade of the supply-demand scissors. He deals only with the demand side.

Using the tools of taxation, subsidization, limitation and stringent regulation, the President hopes to limit energy consumption. In fact though, the true impact of his directions would result in no more than a temporary redistribution of income. Auto makers, oil and gas producers will lose out as the bureaucracy attempts to regulate their markets. Home insulation industries and coal mining and equipment firms will benefit as the results of cross substitution of demand are felt.

President Carter's energy package provides for the following:

Tax oil produced in the U.S. to bring its controlled price up to the uncontrolled world price, rebating the revenues raised to the public through cuts in payroll withholding;

Increase, but not deregulate, the price of newly discovered natural gas to $1.75 a thousand cubic feet from $1.45, while bringing gas produced and sold within the same state under the ceiling, too;

Require most utilities and industries eventually to convert from burning oil or gas to coal and impose tax penalties and provide incentives to encourage both coal conversion and petroleum conservation;

Tax gas-guzzling cars, starting with 1979 models;

Set minimum national standards for utility rates.

It ignores though, the production side of the question and, in that area, has been called "an unmitigated disaster," according to Senate Finance Committee Chairman Russell Long.

Dr. W. W. Rostow, a University of Texas Professor who was a national security advisor to former President Lyndon B. Johnson, has predicted that under Carter's program actual dependence on foreign oil could use to 15 million barrels a day by 1985. "All hands concede that this would constitute economic disaster for the United States and the Western world," he announced. Yet his solutions deal primarily only with efforts to increase domestic oil production.

Oil though, no matter how extensive the supply, is an exhaustable resource. I fail to understand therefore, how encouraging an accelerated use and depletion of this limited resource is going to make the United States energy independent.

There therefore is one and only one long term solution to our energy crisis—the development of alternate sources of energy. What I propose is the creation of a Manhattan Project for the study and advancement of economic cost based solar energy. Recognizing the political pressure exerted by current energy suppliers—oil, gas, and coal producers—against such a massive investment contrary to their present revenue interests, I propose the following private inducements as well:

(1) Give a full 100 percent tax credit for the installation of all solar power based energy suppliers. The initial cost therefore to the individual or firm that converts to solar power would be zero. Clearly this would create a massive solar energy demand and immediately reduce our dependence on foreign supplied energy. The U.S. House of Representatives has proposed a 30 percent credit on the first $1,500 invested plus 20 percent on the next $8,500. It therefore allows a maximum of $2,150. It also is restricted to homeowners. It is not enough.

(2) To encourage investment in and development of solar energy power products legislate a 5 year tax moritorium on all profits made on the production and sale of such energy producers. Here therefore, with all profits tax free, we could expect not only present energy producers but other manufacturing, research, and development firms to enter into the market, both increasing competition and maximizing product evolution.

President Carter's program admits defeat. It asks for sacrifices and retrenchment. Instead I suggest we go forward, relying on the incentives of our capitalistic system and confident in our technological capabilities.

STATEMENT OF THE GARY WESTERN CO.

During the Fall of 1973, shortly after the Arab Oil Embargo, Gary Western Co. began negotiations to acquire an 8,300 BPD refinery located at Fruita, Colorado. Gary was convinced that there was a shortage of domestic refining capacity and that a refinery acquisition was a prudent investment. Gary's purchase negotiations were conducted prior to the Federal Energy Administration's (FEA) promulgation of the two tier crude oil pricing system and Mandatory Petroleum Allocation Regulations. Thus, Gary purchased the refinery without knowledge of the impact that crude supply and pricing regulations would have on their acquisition.

Gary completed its acquisition of the refinery on December 22, 1973. Less than one month later, on January 15, 1974, the Mandatory Petroleum Allocation and Price Regulations went into effect. The implementation of these new regulations imposed unforeseen hardships on Gary. Small independent refiners such as Gary do not control large crude reserves as do those refineries owned by major oil companies. Therefore, with the adoption of the allocation and price regulations, Gary became locked into a crude supply of virtually all "new oil" [1] with extremely high transportation costs of approximately $.90 per barrel, which is much greater than the typical transportation costs of larger, pipeline connected refiners. A combination of FEA's allocation and price regulations and the substantial costs associated with acquisition and start-up of the refinery resulted in net losses for the first 12 months of operations amounting to 28 percent of Gary's original refinery investment.

On December 4, 1974, one year after the Gary refinery commenced operations, FEA adopted the "Entitlements Program" [2] in an effort to equalize crude oil costs for all classes of refiners through a system of monetary transfers. The program was initiated by FEA with the realization that some refiners, usually those operated by major oil companies, had a significant cost advantage due to greater access to "old crude oil" [3] which sold at an average ceiling price of approximately $5.00 per barrel. In contrast, many refiners who did not control crude oil production, usually small independent refiners, were forced to purchase "uncontrolled" domestic crude oil or imported crude oil priced at approximately $10.00 and $13.00 per barrel respectively in August of 1974.

In its analysis of the disparity that existed in average crude costs among refiners FEA discovered that:

> . . . many small and independent refiners, accounting for a large share of the independent refining sector, have been forced to cut margins and sustain reductions in their market shares due to their disproportionate reliance upon crude oil sold at uncontrolled prices . . . [4]

Thus, through the entitlements program, FEA allocated the benefit of access to lower priced domestic crude oil through a system of direct payments by entitlement "buyers" to entitlement "sellers". This program, reduced, to some extent, the competitive advantage of vertically integrated major refiners. Under this program, refiners with a higher than average proportion of "deemed old oil" [5] are required to purchase entitlements from refiners with a lower than average proportion, or from eligible firms with no deemed old oil supplies. This has the effect of equalizing crude oil costs to all U.S. refiners.

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[1] "New oil" originated as "new crude petroleum" at 39 F.R. 1924 (January 15, 1974) and read: "New crude petroleum" means the total number of barrels of domestic crude petroleum produced and sold from a property in a specific month less the base production control level for that property.

[2] "Entitlements Program" is a common designation for regulations promulgated in Title 10 CFR 211.67, originally known as the Old Oil Allocation Program and since April 1, 1976, known as the Domestic Crude Oil Allocation Program.

[3] "Old crude oil" originated at 39 F.R. 31622 (August 30, 1974) and read: "Old crude oil" means the total number of barrels of crude oil produced and sold from a property in a specific month, less the total number of barrels of new crude oil for that property in that month, and less the total number of barrels of released crude oil for that property in that month.

[4] 39 F.R. 39740, November 11, 1974.

[5] "Deemed old oil" originated at 41 F.R. 13899 (April 1, 1976) and read: "(2) To calculate the number of barrels of deemed old oil included in a refiner's adjusted crude oil receipts for purposes of the definition of national domestic crude oil supply ratio in 211.62 of this subpart, paragraph (b)(1) of this section and paragraph (c) of this section, each barrel of old oil shall be equal to one barrel of deemed old oil and each barrel of upper tier crude oil shall constitute that fraction of a barrel of deemed old oil the numerator of which is equal to the reported weighted average cost per barrel to refiners of imported crude oil for that month, less the sum of 21 cents and such weighted average cost per barrel to refiners of upper tier crude oil, and the denominator of which is the entitlements price for that month."

Historically, the refineries of major oil companies have not been treated as profit centers but rather as channels of distribution for petroleum products. These companies have looked to their crude production for the necessary profits to affect the overall desired return on their investments. The Federal Trade Commission explained the logistics of this profit transfer as follows:

> . . . major integrated oil companies have been able to capitalize upon the existence of import quotas, state prorationing, and oil depletion allowances to limit effectively the supply of crude oil to a point which reduces their refinery profits to zero. Clearly such a system creates a hazardous existence for independent refiners who have little or no crude production. In such an environment, only those independent refiners who have: (1) lower costs through location or other advantages; (2) some monopoly power in a local market; (3) sufficient access to inexpensive imported oil, can survive.[6]

Thus, small refiners such as Gary, who do not control sufficient crude oil production and could not take profits at the wellhead, were forced to compete with major refiners and attempt to make a profit, even though the majors were operating at marginal or breakeven levels.

Historically Congress and FEA have acknowledged the importance of small independent refiners to maintaining competition in the petroleum industry. Congress, in the Economic Stabilization Act of 1970, as amended, recognized the need to assist small companies by providing appropriate exemptions from regulations promulgated pursuant to that Act.

Congressional intent was expressed and expanded in both the Emergency Petroleum Allocation Act of 1973 and the Energy Policy and Conservation Act of 1975 to include fostering competition in refining and the maintenance of the competitive viability of small refiners.

The Federal Energy Administration, as a result of the intent expressed by Congress in the above legislation, has consistently supported preservation of the competitive viability of small refiners through its regulations. Below is a summary of FEA rulemaking which reflects its support for small refiners:

1. August 1974.—original FEA Proposed Rulemaking for the Proportionate Allocation of Old Oil. FEA recognized small refiners' disadvantage.[7]
2. November 1974.—FEA amended original proposed regulations and included a specific calculation awarding small refiners an additional entitlement adjustment.[8]
3. December 1974.—FEA adopted final rulemaking and concluded that the bias initially proposed was insufficient to ensure the competitive viability of small refiners. Final rule provided maximum bias.[9]
4. December 1974.—FEA adopted Special Rule No. 3 for the aid of certain small refiner entitlement buyers.[10]
5. February 1975.—FEA extended Special Rule No. 3 to allow certain small refiners additional time to make appropriate adjustments required by the entitlements program.[11]
6. January 1976.—FEA adopted Special Rule No. 6, again for the benefit of certain small refiners.[12]
7. February 1976.—FEA issued a notice of proposed rulemaking and asked for comments as to whether or not Special Rule No. 6 created an unfair economic or competitive advantage for certain small refiners with respect to other small refiners.[13]
8. May 1976.—FEA revoked Special Rule No. 6 and increased additional entitlements issuable to all small refiners. FEA's analysis indicated that this action had greater merit than any other alternative course.[14]

The entitlements program and the small refiner bias have had a substantial impact on Gary's profitability. However, even with the benefit of the small refiner bias, Gary's refinery has only been marginally profitable during the last two years of its three and one-half year period of ownership. Low profitability has been primarily due to erratic and inadequate crude supply problems, increases in transportation costs and inefficiencies in our refinining process. Without the small

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[6] "Energy Crisis and Small Business", Permanent Select Committee on Small Business, 93rd Congress, First Session, July 1973, p. 21.
[7] 39 FR 31650, August 30, 1974.
[8] 39 FR 39740, November 11, 1974.
[9] 39 FR 42246, December 4, 1974.
[10] 39 FR 44710, December 27, 1974.
[12] 41 FR 1044, January 6, 1976.
[11] 40 FR 6197, February 10, 1975.
[13] 41 FR 9391, March 4, 1976.
[14] 41 FR 20392, May 18, 1976.

refiner bias in the current entitlements program, Gary's net losses for the two year period would have forced the Fruita refiney to shut down.

Because of these poblems of crude supply, cost and reduced yields, Gary has decided to convert its existing refinery to a conventional hydroskimming plant utilizing a different crude supply. Gary's planned conversion implements the goals of the Emergency Petroleum Allocation Act and the Energy Policy and Conservation Act through increased production capacity and increased fuel efficiency. Gary currently runs 5500–6000 barrels per day (BPD) of Utah Altamont Crude. Upon completion of the planned conversion, Gary will increase its daily throughput to 10,000 BPD of Colorado Rangely Crude will convert its coker to an atmospheric crude distillation unit, drastically reducing plant fuel consumption and increasing overall product yield to an efficiency level of 96 percent, an increase of 23 percent from its December, 1973 product yield. This investment represents approximately 38 percent of the original investment in the refinery and is a significant financial commitment for Gary.

Gary's decision to expand its capacity and increase efficiency was premised on the continuation of the entitlements program and the small refiner bias. This assumption appeared to be valid because of the consistent support given by Congress and FEA to maintaining the competitive viability of small refiners.

On August 5, 1977 the House of Representatives passed H.R. 8444 which establishes a comprehensive National Energy Policy. H.R. 8444 as passed by the House contains a crude oil equalization tax (COET) to be imposed on the first purchase price of domestically produced crude oil. The tax increases the cost of all crude oil to the world price by 1980, with a tax termination date of September 30, 1981. COET will obviate the necessity for the crude oil entitlements program, because it will equalize the cost of old, new, and imported oil. Other COET benefits are reduction of consumer consumption and elimination of the burden of administering the entitlements program. One unforeseen consequence of COET, however, is its impact on small refiners. Most small refiners are marginally profitable and the loss of the the small refiner bias will undoubtedly force many of these refineries to shut down.

Without the benefit of the small refiner bias, Gary Western Co. would not expand its refinery. Gary has projected a reasonable return on its investment under the new configuration based on the continuation of the small refiner bias. If COET is enacted, as passed by the House of Representatives, Gary could not withstand the losses that would be incurred and would be forced to shut down its refinery. In addition to Gary's shutdown, other small refineries serving the Rocky Mountain area would probably also be forced out of business. These shutdowns would remove a significant portion of the petroleum products presently available in an area of our country where population centers are widely dispersed. Consequently, independent marketers would be forced to obtain their supplies from more distant sources and thus incur greatly increased transportation costs. Another consequence of refinery shutdowns would be the loss of many jobs in the impacted area.

Gary recognizes the increased efficiency and lower per unit cost for refining facilities that operate in excess of 175,000 barrels per day. Yet, not every market has sufficient demand to warrant a refinery of this size. Certain geographic market areas can most economically be served by the small refiners within those localities. Further, many independent gasoline retailers have remained competitive with major oil company retail outlets because of the availability of gasoline supplies from these small refiners. In fact, the Permanent Select Committee on Small Business and the Federal Trade Commission have been so concerned about the issue, that in hearings on the "Inadequacy of Petroleum Supplies and Its Repercussions on Small Business" a Permanent Select Committee spokesman stated:

> Numerous sources of supply which were previously available to small businessmen, both wholesalers and retailers, have disappeared. The Committee notes that this elimination of sources occurred in many instances after mergers of and acquisitions by major oil companies. This elimination of competition has operated to the severe detriment of the petroleum markters.[15]
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> . . . The impact of this control upon the small independent businessman becomes ever more critical . . .[16]

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[15] John M. Blair, "The Control of Oil", New York, Pantheon Books, 1976, p. 129.

[16] "Inadequacy of Petroleum Supplies and Its Repercussions on Small Business", H. Rept. 29-1618, October 18, 1972, p. 12.

The FTC, during an investigation conducted in 1971 noted:

> Although largely dependent on all major firms for their crude supply, the independents sold only 14 percent of their gasoline output back to the majors. The bulk of their refined product was sold to independent retailers many of whom rely exclusively upon independent refiners for their gasoline supplies.[17]

We believe the small and independent refiner and the independent retailer have an important role in maintaining competition in an environment dominated by the large integrated oil companies. Approximately 20 percent of the refining capacity in the U.S. today is provided by 110 small and independent refiners. If the crude oil equalization tax is enacted without a provision similar to the small refiner bias, many of these refiners' profitability and ultimate survival will be jeopardized. The American Petroleum Refiners Association conducted a study of 54 small refiners to determine the projected impact of removing the small refiner bias (Schedules A-E attached). The processing capacities of these refiners ranged from 2,000 to 36,500 BPD. Removal of the small refiner bias resulted in projected net losses over a twelve month period for all of the refiners studied.

The impact of COET on small refiners was recently analyzed by the Federal Trade Commission's Bureau of Competition and this analysis, summarized in a July 13, 1977 letter[18] to Senator Edward Kennedy, stated:

"Our analysis indicated that the Plan (Carter Energy Plan) may have the following general effects . . .

1. The termination of the entitlements and related regulatory programs as part of the Plan will cause difficulty for some small refiners.
2. The crude oil equalization tax may continue or worsen certain distortions in the prices of certain grades of crude oil. Without allocation programs this situation probably will rebound to the benefit of vertically integrated major refiners.
3. The relative makeup of the composite demand for petroleum products may change, to the advantage of large, complex refineries.
4. New domestic refining entry will continue to be difficult.
5. The Plan's drastic reduction in the overall rate of product demand will restrict the demand for grass roots capacity.
6. Product imports may rise to satisfy any increases in demand, or to satisfy current demand, thus deterring domestic de novo refining entry, and creating a relative advantage to foreign refineries.
7. Working capital requirements for refinery inventory will rise.
8. Because the tax-imposed crude oil price rise may not be immediately translatable into product price rises of equivalent magnitude, the already existing margin squeeze that has deterred major entry for a number of years may worsen in the short run.
9. Any adverse effects from the Plan upon new entry would occur in the context of existing entry barriers."

The Bureau concludes that COET's impact on an already anticompetitive industry will be to make it more anitcompetitive. Gary enthusiastically concurs with the Bureau's conclusions.

FEA, in compliance with congressional directives, has consistently promoted regulations supporting the preservation of the competitive viability of small refiners. In a recent report[19] to Congress concerning small refiners the FEA Office of Oil and Gas discussed several interesting facts:

1. The report to Congress was prepared in compliance with Section 123 of the Energy Conservation and Production Act which provides:

> It is the intent of the Congress that, for the purpose of fostering construction of new refineries by small and independent refiners in the United States, the Administrator of the Federal Administration shall take such action . . . to insure that rules, regulations or orders issued by him do not impose unreasonable, unnecessary, or discriminatory barriers to entry for small refiners and independent refiners.

2. The control exercised by all refiners over 175,000 BPD of capacity for a five-year period (1972-1976) has dropped from 82.4 percent to 75.9 percent.
3. The most significant portion of the benefits of the small refiner are derived from the small refiner bias in the entitlements program.

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[17] "Energy Crisis and Small Business", p. 11.
[18] Congressional Record—Senate, July 25, 1977, S12772.
[19] "Impact of Mandatory Petroleum Allocation, Price and other Regulations on the Profitability, Competitive Viability, and Ease of Entry of Independent Refiners and Small Refiners", Report to Congress (Public Law 94-385, Section 123) March 1977.

FEA's implementation of the small refiner bias has contributed significantly to the realization of the goal set forth in Section 123 of the ECPA—new refineries are being built, or existing refineries expanded, by small and independent refiners in the United States, and the historic control exercised by major oil company refiners is being diluted. The crude oil equalization tax, unless amended to include a tax credit for purchases of crude oil by small refiners which offsets the loss of the small refiner bias, will force large numbers of small refiners out of business and thus, contravene Congressional intent as expressed in existing legislation.

Gary Western Co., as a small independent refiner, hopes that this review clearly illustrates the necessity for relief similar to the existing small refiner bias, to insure survival of a very important segment of this nation's petroleum industry.

SCHEDULE A

EFFECT OF SMALL REFINER'S BIAS ON 11 REFINER'S PROCESSING 10,000 BBL/D AND UNDER SUMMARY OF 12 CALENDAR MONTHS

[In thousands of dollars]

	With small refiner bias	Without small refiner bias
Sales	284,234	284,234
Cost of sales	245,400	279,024
Gross profit	38,834	5,210
Other operating expenses	17,911	17,911
Net income (loss) from operations	20,923	(12,701)
Other income	820	820
Net income (loss) before Federal income tax	21,743	(11,881)
Federal income tax	10,437	
Net income (loss)	11,306	(11,881)

RELATED STATISTICS

Total stockholders' equity or partners' capital employed in refining operations	46,585
Total assets employed in refining operations	110,517
Working capital employed in refining operations	38,262
Total small refiner's bias received	33,624
Total runs to still for period covered	21,145
Small refiner's bias received per barrel run to still	1.59
Return (loss) on assets employed (percent):	
With small refiner's bias	10
Without small refiner's bias	(11)

SCHEDULE B

EFFECT OF SMALL REFINER'S BIAS OF 7 REFINER'S PROCESSING OVER 10,000 BBL/D SUMMARY OF 12 CALENDAR MONTHS

[In thousands of dollars]

	With small refiner bias	Without small refiner bias
Sales	618,636	618,636
Cost of sales	558,995	597,948
Gross profit	59,641	20,688
Other operating expenses	18,180	18,180
Net income (loss) from operations	41,461	2,508
Other income (expense)	(3,032)	(3,032)
Net income (loss) before Federal income tax	38,429	(524)
Federal income tax	18,446	
Net income (loss)	19,983	(524)

RELATED STATISTICS

Total stockholders' equity or partners' capital employed in refining operations	130,603
Total assets employed in refining operations	263,975
Working capital employed in refining operations	20,788
Total small refiner's bias received	38,953
Total runs to still for period covered	52,908
Small refiner's bias received per barrel run to still	.74
Return (loss) on assets employed (percent):	
With small refiner's bias	8
Without small refiner's bias	0

SCHEDULE C

EFFECT OF SMALL REFINER'S BIAS ON 15 REFINER'S PROCESSING 20,000 BBL/D AND UNDER SUMMARY OF 12 CALENDAR MONTHS

[In thousands of dollars]

	With small refiner bias	Without small refiner bias
Sales	541,264	541,264
Cost of sales	471,191	526,541
Gross profit	70,073	14,723
Other operating expenses	27,455	27,455
Net income (loss) from operations	42,618	(12,732)
Other income	763	763
Net income (loss) before Federal income tax	43,381	(11,969)
Federal income tax	20,823	
Net income (loss)	22,558	(11,969)
RELATED STATISTICS		
Total stockholders' equity or partners' capital employed in refining operations		89,418
Total assets employed in refining operations		206,344
Working capital employed in refining operations		47,568
Total small refiner's bias received		55,350
Total runs to still for period covered		48,163
Small refiner's bias received per barrel run to still		1.15
Return (loss) on assets employed (percent):		
With small refiner's bias		11
Without small refiner's bias		(6)

SCHEDULE D

EFFECT OF SMALL REFINER'S BIAS ON 3 REFINER'S PROCESSING OVER 20,000 BBL/D

SUMMARY OF 12 CALENDAR MONTHS

[in thousands of dollars]

	With small refiner bias	Without small refiner bias
Sales	361,606	361,606
Cost of sales	333,204	350,431
Gross profit	28,402	11,175
Other operating expenses	8,636	8,636
Net income (loss) from operations	19,766	2,539
Other income (expense)	(2,975)	(2,975)
Net income (loss) before Federal income tax	16,791	(436)
Federal income tax	8,060	
Net income (loss)	8,731	(436)
RELATED STATISTICS		
Total stockholders' equity or partners' capital employed in refining operations		87,770
Total assets employed in refining operations		168,148
Working capital employed in refining operations		11,482
Total small refiner's bias received		17,227
Total runs to still for period covered		25,890
Small refiner's bias received per barrel run to still		.67
Return (loss) on assets employed (percent):		
With small refiner's bias		5
Without small refiner's bias		0

SCHEDULE E

EFFECT OF SMALL REFINER'S BIAS ON 18 REFINER'S PROCESSING FROM 2,000 TO 36,500 BBL/D

SUMMARY OF 12 CALENDAR MONTHS

[In thousands of dollars]

	With small refiner bias	Without small refiner bias
Sales	902,870	902,870
Cost of sales	804,395	876,972
Gross profit	98,475	25,898
Other operating expenses	36,091	36,091
Net income (loss) from operations	62,384	(10,193)
Other income (expense)	(2,212)	(2,212)
Net income (loss) before Federal income tax	60,172	(12,405)
Federal income tax	28,883	
Net income (loss)	31,289	(12,405
RELATED STATISTICS		
Total stockholders' equity or partners' capital employed in refining operations		177,188
Total assets employed in refining operations		374,492
Working capital employed in refining operations		59,050
Total small refiner's bias received		72,577
Total runs to still for period covered		74,053
Small refiner's bias received per barrel run to still		.98
Return (loss) on assets employed (percent):		
With small refiner's bias		8
Without small refiner's bias		(3)

STATEMENT BY CORNELL C. MAIER, PRESIDENT AND CHIEF EXECUTIVE OFFICER, KAISER ALUMINUM & CHEMICAL CORP.

Kaiser Aluminum & Chemical Corporation recognizes that the nation faces a serious and complex energy problem and supports the adoption of a program aimed at conservation, the orderly conversion to coal and the development of new energy sources as financial, time, technological and environmental constraints will allow.

Unfortunately, the full economic impact of the abrupt and revolutionary changes which are embodied in H.R. 8444 have not been fully analyzed and taken into consideration in the formulation of the tax aspects of the proposed energy program. Rather than being directed primarily toward new installaitons, the bill attempts to force conversion of existing facilities to coal in an unrealistically short period of time by establishing a system of rigid punitive user taxes. If enacted in its present form, the bill will severely discriminate against certain industries and geographical areas of the country. Urgently needed modernization programs will have to be postponed and some production facilities shut down. The net result will be increased inflation, severe competitive dislocation and substantial damage to our national economy.

For the reasons discussed in this statement, we believe it is essential the bill be amended in the following six respects in order that the energy goals be achieved within a reasonable time frame and without major economic dislocations:

1. Defer the imposition of all energy user taxes three years.
2. Define the cogeneration facilities eligible for Tier 3 tax treatment.
3. Expand the definition of alternative energy property to provide flexibility to include jointly-owned property and property constructed by utilities pursuant to long term industrial contracts.
4. Restore the regular 10-percent investment tax credit to alternative energy property used as a credit against user taxes.
5. Modify the provisions pertaining to the carryforward of energy investments and excess user taxes.
6. Specify conditions under which reclassification downward or exemption from user taxes will occur.

KAISER ALUMINUM & CHEMICAL CORP. BACKGROUND

Kaiser Aluminum, headquartered in Oakland, California, owns and operates 107 manufacturing plants and major support facilities in 34 states and, through subsidiaries and affiliates, operates in 22 foreign countries. We employ approximately 26,000 people. Our principal products include: primary, semi-fabricated and finished aluminum products; industrial and agricultural chemicals; and refactories. Last year the corporation had sales of $1.8 billion and a net income of $44.5 million.

ALUMINUM IS PART OF THE ENERGY SOLUTION

Because of its versatility and unique combination of qualities, aluminum is used extensively today in every segment of the U.S. economy, including transportation, building and construction, electrical applications, containers and packaging, machinery and equipment, aerospace and defense.

The properties of aluminum also make it the material of choice for many energy saving applications. It weighs one-third as much as steel or copper, it does not rust, is easily formable and is one of the most efficient conductors of heat and electricity. Finally, once it has served a useful product life, it can easily and inexpensively be recycled and reused.

One of the most productive energy saving applications for aluminum is in weight savings in automobiles, buses, trucks and other vehicles. It has been established that reduction in vehicle weight is the single most significant change that can be made to improve gasoline mileage. Aluminum saves up to 2¼ pounds of vehicle weight per pound of aluminum substituted for iron and steel in a car. Today there are nearly 100 pounds of aluminum used in an automobile in manifolds, transmission housings, bumpers and other parts. We have estimated that a total of 325 pounds of aluminum substituted in a mid-sized passenger car will save enough weight to meet the 1985 mileage standard of 27.5 miles per gallon mandated by law. The additional net energy savings through the increased use of aluminum is very substantial.

Weatherization is also expected to lead a significant growth in demand for aluminum as the nation moves to insulate homes and commercial buildings as a major conservation measure. As an example, the National Bureau of Standards has said that storm windows and doors—for which aluminum is a major material—can reduce home heating fuel consumption by 10 to 15 percent. Insulated aluminum siding and reflective aluminum foil backing for ceiling and wall insulation are other uses where aluminum will help conserve energy.

Those features of the proposed energy program which will stimulate the increased use of materials with energy saving qualities will result in an increase in demand for aluminum. This will necessitate expansion of domestic aluminum production facilities if this increased demand is to be met without further reliance on imported aluminum. An enormous amount of capital will have to be expended by the industry, and new energy sources developed to assure an adequate supply of aluminum. These new investment capital requirements must be reconciled not only with the capital expenditures for conversion and conservation mandated in the national energy bill, but also with essential capital needs to maintain and modernize existing facilities.

KAISER ALUMINUM'S ENERGY REQUIREMENTS

In 1976 Kaiser Aluminum consumed 168 trillion Btu's of energy in its domestic operations. In compliance with the Energy Policy and Conservation Act of 1975, the Federal Energy Administration identified us as being one of the top 50 energy using companies in four of the ten largest energy consuming industries. The four industries are Chemicals, Primary Metals, Fabricated Metals and Stone, Clay and Glass.

The company consumes all forms of fossil energy, from natural gas to coal, in many different processes. These uses include large boilers producing steam, fertilizer feedstock, critical aluminum process furnaces and refractory kilns. Electricity is an essential part of the aluminum reduction process representing approximately sixty percent of our total energy consumption. This large electrical demand necessitates that we be concerned with policies that affect both electrical generation and electrical consumption.

Much of our natural gas consumption is along the Gulf Coast where natural gas is purchased in the intrastate market under long term contracts and is used

to self-generate steam and electricity. During the Korean War, and at the government's urging, Kaiser Aluminum located its Chalmette primary reduction plant, one of the largest in the country, near New Orleans, Louisiana to take advantage of the availability of natural gas. Our capital investments along the Gulf Coast are very large—with more than a $¾ billion investment in Louisiana alone, which has a replacement value of $1.6 billion. Until recent years, the coupling of aluminum production with natural gas production was highly advantageous and sought after. Natural gas was being discovered, associated with oil, and aluminum represented a useful market for the gas to avoid its flaring.

We operate one of the largest industrial generating plants in the country at Chalmette, generating over 500 megawatts of electric power—all for our own consumption. Our plants at Baton Rouge and Gramercy also generate substantial electricity utilizing natural gas, and also cogenerate steam and electricity, a highly energy efficient practice.

THE ECONOMIC IMPACT OF THE HOUSE-PASSED BILL

The severe adverse economic impact of the provisions contained in H.R. 8444 on energy-intensive companies such as Kaiser Aluminum has not been fully recognized or evaluated. Our estimates indicate the cost of Kaiser Aluminum of converting or replacing oil and gas-burning facilities with coal over the 1978–1985 period will be over $650 million (in 1977 dollars) in the State of Louisiana alone. To put this figure in perspective, our total net income from all domestic and foreign operations during the eight year period 1969–1976 was only $421 million.

The most optimistic coal conversion timetable for large power plants, according to studies done by our company and confirmed by independent consultants and utilities, is from 7 to 8 years. The primary reason for this is that "conversion" is the wrong word. Conversion does not accurately describe what must be undertaken by companies seeking to comply with the coal conversion provisions of the energy bill. None of our power plants are convertible to coal. They must be completely replaced and existing power plants scrapped.

Moreover, a 7 or 8 year construction schedule can be achieved only if boilers, turbines and generators, along with the required engineering support, are available. This assumption is implicit in the proposed energy program, but recent testimony before this Committee by boiler manufacturers and representatives of the engineering industry throw considerable doubt on its validity.

Some of the existing power plants which will have to be scrapped have substantial remaining economic lives. Assuming a 1985 conversion timetable, we will have to abandon facilities with an estimated remaining economic life of $84 million based on replacement costs. In several cases, the new power plants cannot be constructed at the same site because of lack of physical space. The new facilities will have to be built miles away from where the power will ultimately be used.

Future energy and energy capital costs will have a profound inflationary impact on the future prices of our products. We estimate that because of rapidly-rising energy costs during the 1977–1985 period, it will be necessary to raise the price of aluminum ingot 6 percent to 7 percent per year solely to recover energy-related capital costs and fuel cost increases. Any additional costs resulting from accelerated coal conversion or user taxes will only exacerbate this problem.

The most significant economic impact of the House-passed bill is the large amount of capital that would be required to accomplish conversion within the time frame contemplated in the bill. We have estimated the total user tax for the period 1979 through 1985 to be over $300 million. We can neither absorb these taxes nor pass them directly along to our customers in the form of higher prices. To obtain a full credit against the user taxes, Kaiser Aluminum would have to convert all its facilities within a limited period of time. We have estimated the total cost of conversion of our Louisiana facilities at over $650 million.

Expenditure of such a large amount of capital for conversion projects would preclude investments in many other new projects that are essential to Kaiser Aluminum. We currently have a substantial backlog of investments which are either required by law—e.g., environmental and OSHA regulations—or are essential to the continued cost and technological competitiveness of our major facilities.

These capital requirements coupled with realistic financial constraints would severely limit our ability to finance new coal conversion projects. Financing in excess of $650 million for coal conversion projects on an accelerated schedule would not be possible without severe disruption to our long-range economic planning.

ESSENTIAL FEATURES OF THE HOUSE-PASSED BILL

The national energy program, as originally proposed by the Administration, delayed the imposition of user taxes on public utilities to reflect the longer lead time required by utilities to convert to coal, due to the size of the facilities involved. However, it failed to recognize that large industrial self-generators face exactly the same time problem in converting their large oil and gas-fired generating facilities to coal.

During the House Ways & Means Committee deliberations on the bill, it was brought out that the same time frame of 7 to 8 years for construction of a coal-fired facility applies to large industrial self-generators. As passed by the House, the energy bill provides that use of oil and natural gas in an industrial self-generating plant with a rated capacity of 100 MW or more, will be taxed as a Tier 3 use in the same manner as a utility.

The nature of many manufacturing processes often precludes a practical substitute for the use of natural gas. Section 4992(b)(2) of H.R. 8444 exempts from the user tax those process uses where there is no substitute fuel which could be used without materially and adversely affecting the manufacturing process or the quality of the goods produced, and the use of which is economically and environmentally feasible.

We believe all of these provisions of the House-passed bill must be retained in the Senate version. The imposition of a tax on a large industrial generating plant before that plant can realistically convert to an alternate fuel or on a process use which cannot be converted, would constitute a penalty for noncompliance when compliance is simply not possible. Imposition of the user tax in these cases would contribute nothing toward the objectives of the energy program, would cause major disruptions in many industries and considerable damage to the industrial economy of the country.

The House-passed bill also provides for Tier 3 tax treatment of a qualifying cogeneration facility, with minimum size and efficiency standards to be established by regulation. We believe the efficiency of cogeneration has been recognized by this tax treatment. The bill, however, fails to provide a definition of a qualifying cogeneration facility. The bill should be amended to include such a definition.

NEEDED REVISIONS TO THE HOUSE-PASSED BILL

Kaiser Aluminum has recommended six amendments to the energy bill as passed by the House of Representatives. All of these amendments deal with the energy user tax which we consider to be the most onerous portion of the bill. These amendments are designed to reduce some of the most severe economic impacts the taxes would have on certain industries and the national economy without materially affecting achievement of the program's objectives. Following are brief descriptions of our recommended amendments:

1. Defer the imposition of all energy user taxes three years

H.R. 8444 would impose a substantial tax on the business use of oil and gas commencing in 1979 for industry and in 1983 for utilities, large industrial self-generators and qualified cogenerators. The principal purpose of this tax is to force conversion to fuels other than oil and natural gas—primarily coal. These taxes are not designed to generate substantial amounts of revenue to finance other aspects of the program. The proposed use taxes are based on a number of assumptions which are, at best, speculative. Few, if any, conversions of major installations can be beyond the planning and engineering stages before significant nonrecoverable tax liabilities are incurred. Further, the ability of private industry to finance these projects within a short period of time is questionable. Finally, the increased demand for engineering services, boilers and other coal-burning equipment will likely result in extended lead times for these conversion projects.

We recommend H.R. 8444 be amended to defer the imposition of the energy user taxes for 3 years. Taxes on Tiers 1 and 2 would thus be imposed in 1982 and Tier 3 in 1986. Deferment of the imposition of these taxes for 3 years will

not materially affect achievement of the program's ultimate conservation and conversion goals.

However, deferral will have three very positive effects. First, it will mitigate the serious economic problems which will occur in certain industries and regions if the taxes are imposed commencing in 1979 as currently proposed. It will eliminate the imposition of billions of dollars of punitive, counterproductive and inflationary tax. Second, an additional 3 years will give Congress and the Administration adequate time to make a comprehensive study of the full economic ramifications of forced coal conversion, and make appropriate adjustments. Third, the additional time will allow for the development of new coal utilization technologies such as fluidized bed combustion. Adoption of these technologies will result in more efficient and economic coal consumption and a reduction in adverse environmental impact.

In short, a 3 year deferral of the user tax would provide a more reasonable time frame for the planning and implementation of a conversion program. This would minimize the adverse economic impact that would result from the unrealistically accelerated conversion timetable provided for in the House-pffassed bill.

2. Define the cogeneration facilities eligible for tier 3 tax treatment

Section 4993 of H.R. 8444 provides that use of natural gas in a qualifying cogeneration facility shall be a Tier 3 use and shall be taxed in the same manner and at the same rates as use by a utility for the generation of electrical power.

Industrial cogeneration is a highly efficient use of energy and results in electric generating efficiencies considerably higher than those achieved in utility power plants. This efficient energy use should not be penalized. Industrial cogeneration provides a significant amount of the generating capacity required for industrial uses which could not be readily assumed by utilities. Moreover, due to the complexity of cogeneration facilities, the time required for fuel conversion is substantial. Accordingly, it is appropriate that cogeneration was classified as a Tier 3 use in the House-passed bill.

Unfortunately, H.R. 8444 fails to define qualified cogeneration, but leaves it for administrative determination. Section 546(b)(2) provides that a qualifying cogeneration facility is one that "meets such requirements respecting minimum size and fuel efficiency as the Commission, by rule, prescribes". This is no definition and fails to set even minimum guidelines for establishing the requirements. We believe this matter is too significant to be left completely to the discretion of the Commission.

Until a qualifying cogenerator is defined, the cogenerator provisions are meaningless. The amount of potential use tax involved is very large. It is essential that industry be able to estimate future tax costs now to permit long range energy planning.

We recommend Congress set a size limit that will include all significant industrial cogenerating facilities and establish reasonable efficiency standards. It is our belief these standards should be based on efficiencies now experienced by the best fossil-fueled steam generating plants operated by utilities. The most modern of these plants generate electricity at approximately 9000 Btu's per kilowatt hour. We suggested this figure as the minimum qualifying cogeneration efficiency.

3. Expand the definition of alternative energy property to provide flexibility to include jointly-owned property and property constructed by utilities pursuant to long term industrial contracts

Part V of H.R. 8444 provides a credit for investments in qualifying alternative energy property which may be offset directly against the industrial oil and gas consumption tax liability. As passed by the House, only investments in qualified alternative energy property owned and operated by the taxpayer are eligible for a credit.

A basic intent of the bill is to establish an energy tax policy which will encourage energy conservation and conversion from oil and natural gas to alternate energy sources. The bill assumes that conversion will be achieved by the taxpayer building and operating alternative energy property. In some situations, it may be advantageous to construct one new large power plant to take the place of several existing plants utilizing petroleum or natural gas. Larger plants may be more economical and energy efficient and may minimize adverse environmental problems.

Ownership of these new power plants could take a number of forms. They might be constructed and operated by utilities based on long term contracts entered into by power users. Several utilities and/or industrial users might join together to own and operate jointly a single power plant. In view of the large amounts of capital and the long construction lead times involved, it is essential that H.R. 8444 be amended to permit users to take a credit against the user tax when they undertake a financial obligation to accomplish conversion to an alternative energy source. This credit should be available regardless of the legal ownership of the new alternative energy source.

If an industrial user enters into a long term contract (seven years or more) to purchase power and a new plant is constructed based in part on this undertaking, the user should be entitled to a credit against his user taxes in the same manner as if he made the investment directly. For example, if a user contracts to purchase 20 percent of the output of a new generating plant, the user should be entitled to take a credit for up to 20 percent of the cost of Section 4996 alternative energy property which is included in the plant. The economic effect of a taxpayer entering into a long term contract to purchase power has substantially the same effect as if the taxpayer borrowed money and constructed his own generating plant. If a taxpayer elects to join with others to jointly own and operate a new generating plant, whether it be through a new corporation or an unincorporated association, the taxpayer should be entitled to take a credit on his proportionate interest in the Section 4996 property included in the new power plant.

We recommend the bill be amended to provide that any taxpayer who has undertaken to pay the capital cost of the Section 4996 property, either directly or indirectly, shall be deemed to have made a qualified energy investment and shall be allowed a credit against the tax imposed by Section 4991. If such undertaking is pursuant to a long term power supply contract, the amount of such investment should be that proportion of the cost of the Section 4996 property which the taxpayer's annual contractual obligation to take power from such facility bears to the designed capacity of such facility. Such indirect investment should be deemed to be made at such time as the Section 4996 property is placed in service or qualified progress expenditures are made with respct to such property, at the election of the taxpayer.

4. Restore the regular 10 percent investment tax credit to alternative energy property used as a credit against user taxes

H.R. 8444 provides for disincentives for the continued industrial use of oil and natural gas in the form of a high use tax. It allows a taxpayer to take a credit against investments in qualifying alternative energy property directly against the oil and gas use tax liability. The bill also provides limited positive incentives for conversion and conservation in the form of a special 10 percent energy investment tax credit. However, a taxpayer who is subject to the user tax and who elects to take credits against the tax with a qualifying energy investment, is not allowed to take the 10 percent energy investment tax credit and is allowed to take the regular investment tax credit only to the extent the current investment in alternative energy property exceeds the user tax liability. The denial of the regular investment tax credit for such investments is unjustified.

A major purpose of the user tax is to promote conversion. A taxpayer who undertakes to convert should not be penalized by the loss of the regular investment tax credit. Since the taxpayer is complying with the goals of the energy program, he should be entitled to the same tax treatment, including the regular investment tax credit, as if there were no industrial use tax. To deny the regular investment tax credit severely penalizes a taxpayer who is complying with the conversion goals of the energy program. We urge the bill be amended to remove this punitive feature.

5. Modify the provisions pertaining to the carryforward of energy investments and excess user taxes

Section 4997(b)(3) of H.R. 8444 provides that qualified energy investments in excess of the user tax imposed shall be "an energy investment carryover to the succeeding calendar year". It is not clear if such energy investment carryover can be carried forward to subsequent calendar years if it is not fully utilized. Since the amount of energy investment in some years may substantially exceed

the user tax incurred, the unutilized carryforward should be available in any subsequent year.

We recommend this section be amended to clearly provide that the energy carryover will be available in an succeeding calendar years.

Section 4997(c) of H.R. 8444 also recognizes that because of the large lead time required to make qualifying energy investments, any user tax in 1979 or 1980, which is in excess of the qualified energy investment for such year, may be carried forward and treated, for the purposes of user tax credits, as a user tax imposed in the following year.

While the problems of matching user taxes and energy investments may be more critical in the early years, they are likely to occur at any time during a lengthy conversion program.

We recommend the bill be amended to permit a carryforward of any excess user taxes during the first five years the tax is in effect.

6. Specify conditions under which reclassification downward or exemption from user taxes will occur

Section 4993(b) of the House-passed bill directs the Secretary to establish, by regulation, a procedure under which he may reclassify energy uses to a lower tier or to an exempt use category if he determines such action is not inconsistent with the goal of encouraging the conversion, or significant conservation in the use of, oil or natural gas as a fuel. In our view, this provision recognizes the need for flexibility in the administration of the program. However, it does not adequately achieve this objective. We believe the standards for reclassification to another tier should be expanded. Failure to broaden this provision will preclude reclassification or exemption in situations where the imposition of taxes would do little toward attaining the program's energy goals. It would also preclude reclassification in instances which could have a severe adverse impact on a regional or the national economy. These adverse impacts could far outweigh the energy goals involved.

We recommend this provision be amended to provide more flexibility to permit temporary reclassification or exemption in cases such as:

1. Delays in the construction of alternative energy property beyond the reasonable control of the user e.g., fire, flood, strike, equipment unavailability, delay in regulatory approvals.

2. Severe local economic hardship—such as unemployment—resulting from early plant retirements or closings caused by a company's financial inability either to undertake and implement a coal conversion program or to incur a high user tax liability.

It is respectfully requested this Committee give favorable consideration to the six amendments recommended above.

WESTON, MASS.

Re: Energy Tax Bill of 1977 (H.R. 8444)

MICHAEL STERN,
Staff Director, Committee on Finance,
Dirksen Senate Office Building,
Washington, D.C.

DEAR MR. STERN: I am writing as a private citizen, and have no vested interest in the outcome of the Bill other than to hope that it will be a useful piece of legislation. and other than that it will direct me, personally, toward the purchase of certain equipment rather than other equipment.

My concern is with the handling by the Bill of expenditures for residences in connection with solar hot water systems.

We recently bought a house in the North East which had a swimming pool. We would like to put in a heater for the pool. We would like also to improve the insulation of the house, install storm windows, and centrally air-condition the house. We would like to do these things in the least expensive manner, but, more importantly, we would require that everything work properly. In the absence of the Bill, we would probably install a natural gas heater for the pool, and have some of the other work done too.

The Bill would pay for enough of the insulation costs so that we could now afford to have all of the insulation-type items done at once. However, if a credit were given for solar equipment used to heat a swimming pool, we would be willing to risk the cost to install such a unit in preference to the gas unit, even though all such units are still experimental, and even though all such units cost several times what a gas heater costs.

We would do this, among other reasons, because by installation of the solar collectors on the roof of the house, we not only put heat into the pool, where we want it, but also take it out of the house, where we don't want it, thereby additionally saving electricity on the airconditioning.

There are four main reasons why a credit should be given for solar heaters for swimming pools:

1. Installation of a solar unit as the *exclusive* means of heating a pool saves whatever fuel would otherwise have been used;

2. Installation of the collecting panels *on the residence* itself acts as an insulator, and thereby serves to save on air-conditioning costs;

3. Any business given to the solar-heating industry can only help to improve the overall product by causing more such businesses to come into existence; and

4. Without such a credit, the experimental nature of solar-heaters, and their high cost, will preclude many persons (such as me) from risking the purchase price at this time, and it is quite obvious that once another heat-source has been installed, few switch-overs will be made without some financial incentive to do so.

For the above reasons, I would suggest inclusion of a credit for solar heating of swimming pools in the limited circumstances of solar heating being the sole heating source, and further that the solar panels be installed in a fashion which performs the complementary function of cooling the residence.

Although I may be the only "private person" making a comment on this Bill, I am sure there are thousands like me out there who feel as I do, and who would be willing to experiment with solar-heating if the Government viewed it as important enough to help defray the expenses involved.

Sincerely,

ANDREW EGENDORF.

P.S.: You may include this letter in the printed hearings report; whether or not it is included, I would like to receive a copy of the report when it is printed.

STATEMENT OF MICHAEL D. DINOMAN, PRESIDENT OF WHEELABRATOR-FRYE INC.

Mr. Chairman and Members of the Committee: This statement sets forth the views of Wheelabrator-Frye Inc. on the scope of certain tax incentive provisions of the "National Energy Act" (H.R. 8444), pending in your Committee.

I. INTRODUCTION

Wheelabrator-Frye Inc. is a recognized world leader in the design, construction and operation of environmental and energy systems. As a company, we are deeply committed to both the development of energy sources other than oil and natural gas and the preservation of environmental quality.

Among the stated objectives of the "National Energy Act" (hereinafter sometimes referred to as the "Act") are the following:

"To reduce significantly this Nation's demand for oil and natural gas";

"To encourage the use of coal and other fuels and renewable energy sources";

"To provide incentives to increase the amount of domestically produced energy";

"To ensure that all actions taken under or pursuant to this Act are carried out in accordance with applicable environmental requirements".

To a considerable degree, each of these objectives will be advanced by the enactment of pending energy tax provisions designed to encourage the development of new energy technologies. In the view of Wheelabrator-Frye, further advancement would be achieved if the present definitions of "alternative energy property" and "recycling equipment" were expanded to include new energy technologies not specifically recognized in the pending legislation.

II. INCENTIVES TO ENCOURAGE THE CONVERSION OF COAL TO A CLEAN FUEL

The energy tax provisions of the Act attempt to encourage the conversion of coal, and other alternative substances, into synthetic gas by providing tax incentives for such conversion.

While Wheelabrator-Frye agrees with the need for tax incentives to encourage private industry to commit the vast amounts of capital necessary to construct commercial-size installations using new technologies such as coal gasification, we believe that the definition of "alternative energy property" set forth in § 4998 (b)(1)(D) of the Act, which currently limits the availability of tax incentives to "equipment for converting an alternate substance into synthetic gas", should be expanded to include equipment used to convert coal (or other alternate substances) into synthetic fuel regardless of the physical state (solid, liquid or gas) of the end product. To accomplish this expansion of the "alternative energy property" definition, we recommend that subsection (D) of § 4998(b)(1) be amended to read as follows:

"(D) equipment for converting an alternate substance into a synthetic *gaseous, liquid or solid fuel*"

Clean conversion of coal

Pollutants can be removed from coal either after the coal is burned by cleaning the flue gas and disposing of the ash residue, or by cleaning the coal prior to burning. The first approach, involving large capital expenditures for stack gas scrubbers has been employed with limited success to remove sulfur oxide, nitrogen oxide and particulates from flue gases before discharge into the atmosphere. Wheelabrator-Frye as a principal manufacturer of air pollution control equipment, is especially aware of the limitations and costs of this approach.

Fortunately, using new technologies, it is possible today to clean the coal before it is burned, thus, converting a relatively "dirty" fuel into an environmentally acceptable form of fuel. These new technologies make it possible to convert coal not only into high Btu pipeline gas and low Btu fuel gas, but also into clean solid and liquid fuels.

Included in the clean solid and liquid fuel categories are synthetic fuels produced using the solvent refined coal (SRC) process. Coal refining results in a clean synthetic fuel which can be produced in either solid or liquid form. This process has been tested for three years in a 50 T/D demonstration facility, designed, engineered and constructed by Wheelabrator-Frye, which is operated under the auspices of the Office of Coal Research at Fort Lewis, Washington.

The SRC process employs a hydrocarbon solvent to remove essentially all sulfur and ash from coal. The removal of the noncombustibles results in a synthetic fuel with a heating value of 16,000 Mtu's per pound. This environmentally clean fuel can be burned without the necessity of stack gas pollution control devices. The SRC product is in either a liquid form that can be piped to an adjacent user or a solid form as flakes or prill (pellets) that can be stored for extended periods and shipped to distant users.

The need for incentives

As in the case with the development of commercial facilities for the conversion of coal to synthetic gas, private industry unaided would find it very difficult at this time to provide or obtain the large sums required to construct plants for the conversion of coal to synthetic liquid or solid fuels.

At the present time, Wheelabrator-Frye is engaged in the design and engineering of a 2,000 T/D SRC plant in Kentucky which, when completed, will cost an estimated $150 million. While Wheelabrator has agreed to make a financial commitment of up to $30 million for the project, financing the remaining $120 million is a tremendously difficult problem which, as yet, has not been satisfactorily resolved. It is a basic fact of life that without significant incentives few private companies can afford to assume the risks involved in financing sums of this magnitude for projects employing new technologies whose economics are largely unproven.

Under the tax provisions of H.R. 8444, such incentives are provided for the construction of facilities to convert coal to synthetic gas; but not for the conversion of coal to synthetic fuels produced in a liquid or solid state. Since all coal conversion facilities have high capital costs, placing them beyond the means of most private companies, the problems faced by companies developing and

financing coal-to-gas plants are essentially the same as for companies developing and financing coal-to-liquid or coal-to-solid plants. In addition, all such plants serve the same essential purpose, i.e. cleaning the pollutants from coal before it is burned. Thus, the tax incentives provided in H.R. 8444 for the conversion of "an alternate substance to synthetic gas" should be extended to include equipment used to convert an "alternate substance" into a synthetic solid or liquid fuel.

III. INCENTIVES FOR THE CONVERSION OF SOLID WASTE INTO A FUEL OR DIRECTLY INTO ENERGY

The Act includes provisions which amend the investment tax credit sections of the Internal Revenue Code to provide an additional 10 percent investment tax credit for certain "energy property." Included in the definition of "energy property" is property which qualifies as "recycling equipment" under a new § 48(1)(7) of the Code. "Recycling equipment" is defined to mean "any equipment which is used exclusively in the recycling of solid waste or to prepare solid waste for recycling."

Under this definition of "recycling equipment," there is considerable doubt whether equipment used to convert solid waste into a solid, liquid or gaseous fuel, or directly into useable energy, would be included in this category of "energy property." In view of the stated objectives of the Act, it seems somewhat incongruous that tax incentives to encourage the development of new "energy property" should favor one form of solid waste conversion, recycling, to the exclusion of other forms which result directly in the creation of new alternative fuel and energy sources. In view of this apparent incongruity in the Act, Wheelabrator-Frye recommends that the definition of "recycling equipment," to be added as 48(1)(7) of the Code, be amended to read as follows:

"(7) Recycling Equipment—The term 'recycling equipment' means any *property* used in the recycling of solid waste *or in the conversion of solid waste to energy or to a solid, liquid or gaseous fuel including property* to sort, *classify handle* and prepare solid waste for recycling *or conversion*."

Technologies included in amended definition

In addition to equipment used in the recycling of solid waste to recover a refined material which can be used to "fabricate an end product",[1] the amended definition of "recycling equipment" would include equipment associated with the four basic "energy conversion"[2] technologies.

(1) *Waterwall Combustion.*—This technology involves the burning of solid waste in a specially designed furnace lined with water-filled tubes, and incorporating a convection section where flue gases transfer heat to pendant boiler tubes. In most facilities constructed to date, solid waste is burned without prior processing on a reciprocating grate system without the use of an auxiliary fuel. Energy is recovered as steam which can be used directly or can be converted to electricity.

Wheelabrator-Frye is one of several companies involved in the construction, ownership and operation of facilities employing the "waterwall combustion" technology. Wheelabrator's first such facility, located in Saugus, Massachusetts, processes approximately 1200 tons of refuse a day, collected from the Greater Boston Area, into steam which is sold to a neighboring industrial plant owned by General Electric.

(2) *Refuse Derived Fuel (RFD).*—This technology involves various processing systems employing size reduction and classification of waste to produce both a combustible fraction and a "heavies" fraction which may be processed for materials recovery. This may be either a "wet" or a "dry" process. These systems are also called "supplemental fuel" systems, since the combustible fraction would typically be marketed as a fuel to outside users e.g. utilities and industries, for use as a supplement to coal (or possibly oil) in their existing boilers.

(3) *Pyrolysis.*—Pyrolysis is a broad term given to a variety of processes where either processed or unprocessed waste is decomposed by the action of heat in an oxygen deficient atmosphere. This results in production of combustible gases or

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[1] See the discussion of "recycling equipment" in the House Ways and Means Committee Report on Title II of H.R. 6831 (subsequently incorporated in H.R. 8444).

[2] U.S. Environmental Protection Agency, Third Report To Congress, Resource Recovery and Waste Reduction, U.S. Government Printing Office (1975) p. 1.

liquids depending on operating conditions. These products may be either burned immediately to produce steam or, those whose quality is high enough, may be transported or stored for use elsewhere.

(4) *Biological Conversion.*—Biological conversion involves the decomposition of solid wate by bacterial action to produce combustible gases. These gases could be burned immediately to produce steam, or transported for use elsewhere if their quality is high enough. Biological conversion can take place in landfills where gas wells are used to collect the gas. Alternatively, digestion can take place in controlled vessels.

The Need For Incentives

The U.S. Environmental Protection Agency calculates that if all the municipal solid waste generated in our Standard Metropolitan Statistical Areas had been tapped for its energy content, 900 trillion Btu's would have been recovered in 1973. This is equivalent to the energy of 154 million barrels of oil per year. By 1980 the energy content of municipal solid waste is expected to climb to 187 million barrels of oil per year.[3]

The EPA also reports that the realization will fall far short of the potential:

"Based on energy recovery systems existing at the present time, it is projected that by 1980 almost thirty cities and counties around the country should be operating the equivalent of about thirty-six 1,000-ton-per-day plants, recovering an estimated 85 trillion Btu per year, or 40,000 barrels of oil per day or 15 million barrels of oil per year."[4]

That means that of the 185 million barrels of oil a year energy potential, we will be achieving only 15 million of them.

Why isn't the potential being realized? Why will the United States be losing the energy equivalent of 179 million barrels of oil per year by 1980? Wheelabrator-Frye believes that, at present, the obstacles to full realization of potential benefits of energy recovery systems are more economic and institutional, than technological. While certain of the new technologies of solid waste energy conversion need to be perfected and improved, other technologies, such as waterwall combustion, are of proven reliability.

Since the economies of energy recovery facilities are tied largely to disposal fees paid principally by municipalities it is critical that such fees are competitive with other disposal alternatives. In this regard, however, EPA reports as follows:

"The rate of implementation of resource recovery is a function of the difference between the net operating cost of proposed resource recovery systems and the cost of current disposal methods. At present, much of the Nation's solid waste is disposed in dumps that do not meet the minimum requirements of sanitary landfills. Because they are inadequately constructed and operated, the direct costs of operating these facilities are much lower than the total social costs including environmental externalities. A strong regulatory and enforcement program would require that such external environmental costs be reduced and would therefore significantly increase the perceived direct costs of disposing of waste on the land. Thus, resource recovery would become economically feasible in more cities. . . ."[5]

Based on this analysis, the economics of resource recovery will be marginal in many areas of the U.S. until 1983 when, pursuant to the "Resource Conservation and Recovery Act of 1976" (P.L. 94-580), all open dumps must be closed or significantly upgraded.

During the next six years, tax incentives, such as those proposed for other categories of "energy property", will play a significant role in encouraging a more rapid transition to environmentally acceptable energy recovery systems; thus, bridging the gap between this Nation's solid waste derived energy potential and its realization of that potential.

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[3] U.S. Environmental Protection Agency, Third Report To Congress, Resource Recovery and Waste Reduction, U.S. Government Printing Office (1975) p. 33.

[4] Ibid, p. 34.

[5] Hearings, "Solid Waste Management And Resource Recovery", Conservation, Energy, and Natural Resources Subcommittee, House Committee On Government Operations, (Mar. 23–31, 1976) pp. 358–359.

NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC.,
Washington, D.C., August 16, 1977.

Hon. RUSSELL B. LONG,
Chairman, Committee on Finance,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: The National Business Aircraft Association, Inc., representing the interests of business aviation in the United States and speaking for more than 1,500 member companies which own or operate business aircraft, welcomes the opportunity of furnishing comments to the Committee on Finance in connection with provisions of the proposed National Energy Act.

The nation's business aviation fleet consists of approximately 45,000 aircraft of all types, ranging from small, single engine aircraft to intercontinental turbojets. Approximately 64.5 per cent of these aircraft are powered by a single piston engine; about 27.8 per cent are twin piston powered; about 4.4 per cent are twin turboprops, and about 3.3 per cent are turbojet powered.

In terms of fuel consumption, business aviation in total ranks as a very minor factor: consumption of jet fuel represents approximately 2 per cent of all jet fuel consumed in the nation; consumption of aviation gasoline by piston powered business aircraft amounts to about 16/100ths of one per cent of total gasoline consumption.

Notwithstanding these very small proportions of petroleum consumption, the business aviation community has since 1973 adopted and promoted a vigorous program of conservation. These included flight crew-initiated methods of aircraft piloting at minimum fuel consumption levels consistent with safe operation, and vigorous consumption levels consistent with safe operation, and vigorous efforts to persuade the Federal Aviation Administration to adopt fuel-efficient ground and air traffic control procedures.

Business aviation serves a vital role in the nation's air transportation system. Its aircraft fly to most of the 13,500 airports in the United States, only a few hundred of which are served by commercial air carriers. Business aviation also serves as a major "feeder" service to the carriers, in that 30 percent of all business aircraft flights are for the singular purpose of interconnecting passengers and/or cargo with the commercial carriers. In short, business aviation is, in many cases, the only air transportation link between centers of commerce and business, or between company headquarters locations and/or airport providing commercial service.

In the original Administration proposal, the National Energy Plan, an additional 4¢ per gallon tax on aviation fuels used in non-commercial aviation was called for. The House of Representatives, however, has rejected that proposal, both in the Committee on Ways and Means and in Committee of the Whole. The proposal would have raised the Federal tax on non-commercial aviation to 11¢ per gallon, and in our opinion, the House action was well justified in the interest of equity and reasonableness.

Other provisions in the revenue portions of the proposed Act would, of course, have indirect yet substantial bearing on business aviation. Among these would be the price impact of the wellhead tax, and the indirect effects, as yet unknown, which could result from market demand and supply changes in other petroleum products used by other consumers and industry groups.

Business aviation since late 1973 has consistently advocated national energy policies which insure "equitable treatment under which available supplies of petroleum products are fairly distributed to all users." We believe that this precept, while stated primarily in terms of fuel supplies, has fundamental, appropriate application to taxes aimed at discouraging energy usage.

We are concerned that the Administration may attempt to win Senate approval of additional taxes on aviation fuels used in non-commercial aviation. We strongly urge that you reject any attempt to increase taxes on non-commercial aviation.

In this regard, we would make two points:

First, we do not believe the proposed tax is necessary for the achievement of energy conservation in general aviation. Along with other aviation fuel users, business and general aviation have already achieved significant conservation.

Secondly, we do not believe the proposed tax is motivated by energy conservation concerns. There appears to be grave doubt as to whether the Administration which proposed the tax believes that it has any relationship whatsoever to the energy situation. In fact, the Report of the House Ad Hoc Committee on

Energy states that "The energy savings from this proposal is estimated to be negligible."

NBAA appreciates the opportunity of making the several following broad recommendations with respect to the energy conservation program, all of which relate to both Titles of the National Energy Act.

1. NBAA Policy on Energy counsels that "governmental regulations pertaining to fuel allocation and pricing should be used only during periods of extreme shortage of petroleum product supply. At all other times, the market forces a competitive enterprise environment should be permitted to operate on a basis unrestricted by government actions." We feel that this policy precept has current application to energy conservation goals, and that allocation and price controls on petroleum products should be removed at the earliest opoprtunity. Permitting the forces of the free market place to work is, in our view, the surest way to permit supply, demand and price factors to enact true conservation.

2. NBAA Policy on Energy ugres "the Federal government to develop a national energy program with high priority given to development of adequate energy sources to meet all U.S. requirements." We believe that the National Enegry Act's provisions, as refined by the process of Congressional action, should more clearly address this desirable goal than is the case in the Administration's legislative proposal. Development of resources, in our view, should have priority at least equal to that of conservation.

3. Finally, NBAA Policy on Energy states that "government action should encourage and mandate where necessary the use of alternative fuels for non-aviation power sources to assist in conserving resources until alternate non-petroleum fuels can be developed for aircraft."

We stress these points in closing: We believe the national air transportation system is a priceless national resource, and that each of the complementary segments of civil aviation (air carrier, air taxi, business and general aviation) should be recognized as filling a vital and singular role within the system. Since there is as yet no alternative fuel to petroleum product which can be used to power aircraft, we believe that vigorous action should be taken to shift to usable alternative fuels for other power sources.

We further believe it is in the national interest for the Federal government to undertake serious research and development activities in airfoil and airframe design, and in aircraft design, which will squarely address the great potential for achieving significant fuel savings in future-generation aircraft. Such research and development efforts should aim for payoff in the mid to late 1980's.

NBAA deeply appreciates this opportunity to present its view to the Committee on Finance and will welcome any questions which the Chairman or Committee members may have on this subject; or indeed, any subject relating to business aviation.

Sincerely,

JOHN H. WINANT, *President.*

STATEMENT OF MEDICAL AREA SERVICE CORPORATION (MASCO)

Medical Area Service Corporation (MASCO) is a fully taxable Massachusetts corporation formed for the purpose of promoting the charitable and educational functions of nine major medical institutions in Boston which are its members. One of MASCO's member institutions is Harvard University (Harvard), which participates on behalf of the Harvard Medical School and the Harvard Schools of Dental Medicine and Public Health. All but one of MASCO's member medical institutions are loosely affiliated with Harvard, and these institutions currently receive part of their steam, chilled water, and electricity needs from the existing Harvard Medical Power House constructed in 1904.

MASCO COGENERATION PLANT

For over six years, MASCO has planned the construction of a total-energy, cogeneration plant which MASCO will operate to supply its member institutions with steam, chilled water, and electric utilities sufficient to meet the needs of all of MASCO's member medical institutions. Construction of the plant commenced on November 17, 1976, and MASCO, through Harvard, had expended approximately 20 percent of the total construction cost of the plant by April 20,

1977. By April 20, 1977, however, MASCO had yet to complete construction and erection of a substantial portion of the plant's cogeneration property.

MASCO has estimated that the total cost of the total-energy, cogeneration plant will be approximately $109 million. Because MASCO does not have sufficient resources to finance the project, Harvard has acted on MASCO's behalf in executing purchase orders, finalizing contracts, and disbursing funds. For permanent financing, MASCO has arranged for a leasing affiliate of a major United States bank to have a specially formed subsidiary purchase the completed total-energy, cogeneration plant from Harvard on a turnkey basis and lease the facility to MASCO under a long-term lease. As the owner of the cogeneration plant, the specially formed subsidiary would be entitled to any available investment credit or business energy credit, but the lease agreement provides that benefit of the credits will be passed on to MASCO through lower rents. MASCO in turn would pass this benefit along to its member medical institutions through lower utility charges since MASCO will sell these utilities to its members at cost.

The total-energy, cogeneration plant derives its name from the concept underlying its design. A "total-energy" facility in engineering parlance means a facility which captures and puts to constructive use the waste energy given off in one process as an energy source for another process. Because of limitations imposed by state air pollution regulations and the location of the plant in a densely occupied urban area, it has been necessary to consider only petroleum-based fuels for the generators. Therefore, MASCO's total-energy, cogeneration plant will have six diesel driven electric generators. However, MASCO will not simply vent the hot exhaust gasses from these diesel engines into the atmosphere as is normally done but will route the gasses to two heat recovery steam generators where they will be incinerated to remove certain pollutants and then cooled to 350 degrees, producing up to 30,000 pounds of usable steam per engine per hour as a by-product.

Similarly, MASCO will generate electricity as a by-product of the operation of the three oil-fired steam boilers which will be installed in the plant as well as from the operation of the heat recovery steam generators. Steam will be generated at a relatively high pressure which is in excess of the pressure required by the steam users. The pressure will then be reduced to the level at which it will be used in extraction-condensing steam turbine generators. The electricity generated in this way as a by-product of utility steam requires less fuel than electricity produced by any other conventional method. MASCO will produce chilled water by using either electricity generated in the plant or steam generated in the plant depending on the economics of the immediate operating situation.

FUEL SAVINGS

As a result of utilizing the total-energy, cogeneration concept, the plant will produce the same amount of utilities as a conventional plant would produce, but it will consume at least 7,000,000 gallons less fuel each year than a conventional plant would consume. This represents a fuel savings of approximately 33 percent.

As typified by the MASCO total-energy, cogeneration plant, the application of the cogeneration concept offers an existing, viable method of achieving significant energy savings. It should be noted, however, that the special utility needs and geographical proximity of MASCO's member institutions provide optimum conditions for the use of a cogeneration system. Institutional barriers such as a requirement for certain demand load profiles, transmission and distribution limitations, and the problem of coordination with existing utility systems have inhibited a broader application of these cogeneration concepts. The potential energy savings which can result from the general implementation of cogeneration systems will be possible, therefore, only if Congress encourages projects such as MASCO's which are currently feasible so that through practical experience these institutional barriers can be explored and overcome.

FIRST PROBLEM

The House, in the National Energy Act, H.R. 8444, consistently recognized that the United States should encourage the use of cogeneration property because the use of such property leads to a conservation of our energy resources.

In section 2061(b) of the proposed Act, the House specifically included cogeneration property as qualified investment property for purposes of the section 2061 business energy credit. However, section 201(f) denies the allowance of accelerated depreciation and the present investment credit in the case of boilers or other combustors fueled by petroleum products unless the use of coal is precluded by air pollution regulations or unless the use will be an exempt use within the meaning of section 4992(b). MASCO believes that Massachusetts air quality regulations preclude it from using coal in its facility but feels that section 2061(f) should, nevertheless, be amended to exempt cogeneration property, and boilers and combustors installed in connection with cogeneration property, from the denial of the allowance for accelerated depreciation and the present investment credit. Without such amendment section 2061(f) will nullify the incentive intended in section 2061(b) by the granting a business energy credit for the installation of cogeneration property.

FIRST PROPOSAL

MASCO proposes that the Senate Finance Committee amend section 201(f)(2) to read as follows:

(2) Boilers, etc., fueled by oil or gas.—Paragraph (1) of section 48(a) (defining section 38 property) is amended by adding at the end thereof the following new sentence: "Such term does not include any boiler or other combustor fueled by petroleum or petroleum products (including natural gas) unless (a) the use of coal is precluded by Federal air pollution regulations or existing State air pollution regulations, (b) the use of such combustor will be an exempt use within the meaning of section 4992(b), or (c) such boiler or combustor is installed in connection with cogeneration property."

MASCO further proposes that the Senate Finance Committee amend section 2061(f)(3) to read as follows:

(3) Denial of rapid depreciation for boilers, etc., fueled by oil or gas.—Section 167 (relating to depreciation) is amended by redesignating subsection (p) as subsection (r) and by inserting after subsection (o) the following new subsection:

"(p) Straight line method for boilers, etc. fueled by oil or gas.—In the case of any boiler or other combustor fueled by petroleum or petroleum products (including natural gas)—

"(1) subsection (b), (j), and (l) shall not apply, and

"(2) the term 'reasonable allowance' as used in subsection (a) shall mean only an allowance computed under the straight line method using a useful life equal to the class life prescribed by the Secretary under subsection (m) which is applicable to such property (determined without regard to the last sentence of subsection (m)(1))."

This paragraph shall not apply if (a) the use of coal is precluded by Federal air pollution regulations or existing State air pollution regulations, (b) if the use of the combustor is an exempt use within the meaning of section 4992(b), or (c) if such boiler or combustor is installed in connection with cogeneration

SECOND PROBLEM

Section 201 of the proposed Act, as passed by the House, allows a business energy credit for investment in qualified energy property. Te term "energy property" includes cogeneration property "installed in connection with an existing facility . . .". The House designed the cogeneration provisions of section 2061 to encourage taxpayers to convert existing conventional generation facilities to facilities employing the principles of cogeneration.

MASCO will make this conversion, thereby conserving the use of petroleum and petroleum products, but has found it to be necessary to effect the conversion by replacing the existing Harvard Medical Power House, which was constructed in 1904, with a new facility rather than installing new cogeneration equipment in the existing facility. The new facility will be located two blocks from the existing facility, and will perform all of the services now performed by the existing facility. MASCO will demolish the existing facility upon completion of the new facility.

Because of MASCO's decision to replace rather than alter the existing facility, and because Harvard had expended only approximately 20 percent of the total construction cost of the new facility by April 20, 1977, MASCO's cogeneration property probably does not fall within section 2061(b)'s provision for "cogeneration property installed in connection with an existing facility . . .", even though it meets all of the criteria employed by the House to determine property in which

the business energy credit should encourage investment. The House intended to limit such encouragement to the conversion of existing conventional facilities to cogeneration facilities, and this is precisely what MASCO intends to do with its existing facility.

SECOND PROPOSAL

MASCO proposes that the Senate Finance Committee clarify the definition of the term "energy property" in section 2061(b) of the proposed Act to include property which is:

(ii) cogeneration property installed in connection with or as a replacement for an existing facility, but only to the extent that the cogeneration energy capacity of such facility or its replacement exceeds the former cogeneration capacity of such facility, . . .

IMPORTANCE OF MASCO'S PROPOSALS

The MASCO total-energy, cogeneration plant typifies the substantial energy savings which the application of the cogeneration concept makes possible. The promotion of the construction and installation of cogeneration property fully comports with the petroleum and petroleum products conservation purposes of H.R. 8444. Because of the existing institutional restraints on the widespread implementation of cogeneration systems, however, the continuation of the present incentive to investment offered by accelerated depreciation and the present investment tax credit will be a key factor in encouraging further development of cogeneration facilities which may eventually lead to the elimination of these institutional barriers. Moreover, the allowance of the business energy credit for cogeneration property installed in connection with or as a replacement for an existing facility will often be a critical factor in encouraging additional investment in cogeneration property. In MASCO's case, the Boston Redevelopment Authority must approve the cogeneration project and can do so only if it finds the project to be a public use and benefit. One factor relevant to that finding will be the availability of tax incentives like the business energy credit which will reduce the cost of the utilities and result in lower hospital and medical costs to the public.

JOHN S. NOLAN.

UNIVERSITY OF COLORADO,
Boulder, Colo., August 17, 1977.

Hon. RUSSELL LONG
Senator from Louisiana,
U.S. Senate, Washington, D.C.

DEAR SENATOR LONG: The hearings that are being held on the President's Energy Plan are extremely vital. I believe that there is a widespread feeling that the United States can get out of the energy crisis by encouraging increased production of our fossil fuels. My study of the arithmetic indicates that increased production can not be the answer. My simple analysis is set forth in the enclosed paper, "The Forgotten Fundamentals of the Energy Crisis". I hope that you will have your staff study this paper. If they find errors in it then it should be thrown away. If they don't find errors—then I hope that this paper could be entered into the official record of your energy hearings in the Senate where it might contribute to improved understanding of a very difficult problem.

Respectfully yours,

ALBERT A. BARTLETT,
Professor of Physics.

Enclosure.

THE FORGOTTEN FUNDAMENTALS OF THE ENERGY CRISIS (1)

(By Albert A. Bartlett)

1. INTRODUCTION

Papers at an energy conference may tend to deal with details. The details are important, but only if they relate to the national or global picture. We know that an energy crisis has motivated us to look at all manner of detail in regard to our own particular uses of energy. We hear political leaders of the United States speaking of "energy self-sufficiency" and of "Project Independence". We have the vague feeling that arctic oil from Alaska will relieve the energy crisis, and we are told that the United States is in good shape in the long run because of our vast deposits of coal. What are the facts?

Rather than take you into the sticky abyss of statistics, I wish to reply on a few data and the pristine simplicity of elementary mathematics. With these basic tools I believe I can give you a new and reasonably clear understanding of the gravity of the energy problem.

2. MATHEMATICAL BACKGROUND; A REVIEW

When a quantity (such as the rate r(t) of consumption of a resource) grows a fixed percent per year, the growth is exponential

$$r(t)=r_0 e^{kt}$$

where r_0 is the current rate of consumption (at t=0), e is the base of natural logarithms, and k is the fractional growth per year. The quantity r(t) will grow to twice its initial value in a time $T_2=(\ln 2)/k$ 70/P where P, the percent growth per year, is 100k. The constancy of the doubling time of the growth means that in one doubling time the growing quantity will double in size, in two doubling times it wil quadruple, in three doubling times it will grow by a factor of $2^3=8$, in four doublings it will grow by a factor of $2^4=16$, etc. It is natural then that we talk of growth in terms of powers of two.

3. THE POWER OF POWERS OF TWO

If you place one grain of wheat on the first square of a chessboard, 2 on the second, 4 on the third, 8 on the fourth, 16 on the 5th, etc. you will have 2^{63} grains on the 64th square and the total grains on the board will be one grain less than 2^{64}. How much wheat is 2^{64} grains? Simple arithmetic shows that it is approximately 500 times the current annual harvest of wheat in the entire world; an amount that is probably larger than all the wheat that has been harvested in the history of the earth. How did we get to this enormous number? We started with one grain of wheat and we doubled it a mere 63 times.

Exponential growth is characterized by doubling, and a few doublings can lead us quickly to enormous numbers.

Populations tend to grow exponentially. The world population today is estimated to be 4 billion people and it is growing at the rate of 1.9 percent per year. It is easy to calculate that at this rate the world population will grow by one billion in less than 12 years, the population will double to 8 billion in 36 years, the population would grow to a density of one person per square meter on the dry land surface of the earth (excluding Antarctica) in 550 years, and the mass of people would equal the mass of the earth in a mere 1620 years! Tiny growth rates can yield incredibe consequences!

Compound interest on your account in the savings bank causes the account balance to grow exponentially. One dollar at an interest rate of 5 percent per year compounded continuously will grow in 500 years to $72,000,000,000 and today the interest would be coming in at the magnificent rate of $114 a second.

Steady inflation causes prices to rise exponentially. An inflation rate of 6 percent per year will, in 70 years, cause prices to increase by a factor of 64. If the inflation continues at this rate the $0.40 loaf of bread we feed our toddlers today will cost $25.60 when the toddlers are retired and living on their pensions. It has even been proven that the number of miles of highway in the country tends to grow exponentially (3).

The reader can begin to suspect that the world's most important arithmetic is the arithmetic of the exponential function.

4. EXPONENTIAL GROWTH IN A FINITE ENVIRONMENT

Bacteria multiply by division (that sounds odd doesn't it) so that one bacterium becomes 2, the two divide to give 4, the 4 divide to give 8, etc. For a certain strain of bacteria the time for this division is one minute. This is recognized as being exponential growth with a doubling time of one minute. I put one bacterium in a bottle at 11:00 AM and I observe that the bottle is full at 12:00 Noon. Here is a simple example of exponential growth in a finite environment. This is mathematically identical to the case of the exponentially growing consumption of our finite resources of fossil fuels. Keep this in mind as you ponder three questions about the bacteria.

(1) When was the bottle half-full?

Answer: 11:59 AM.

(2) If you were an average bacterium in the bottle, at what time would you first realize that you were running out of space?

There is no unique answer to this question, so let me ask, "At 11:55 AM, when the bottle is only 3 percent filled and is 97 percent empty, how many of you would perceive that there was a problem?"

Suppose that at 11:58 some farsighted bacteria realize that they are running out of space in the bottle and consequently, with a great expenditure of effort and funds, they launch a search for new bottles. They look offshore and in the Arctic, and at 11:59 AM they discover three new empty bottles. Great sighs of relief come from all the worried bacteria, because this magnificent discovery is three times the number of bottles that had hitherto been known. The discovery quadruples the total space resource known to the bacteria. Surely this will solve the problem so that the bacteria can be self-sufficient in space. The bacterial "Project Independence" must now have achieved its goal.

(3) How long can the bacterial growth continue if the total space resources are quadrupled?

Answer: Two more doubling times (minutes).

Table 1 documents the last minutes in the bottles.

TABLE 1

The Effect of the Discovery of New Bottles

Bottle No. 1 is one quarter full at 11:58 a.m.
Bottle No. 1 is half-full at 11:59 AM.
Bottle No. 1 is full at 12:00 Noon.
Bottles No. 1 and 2 are both full at 12:01 PM.
Bottles No. 1, 2, 3, 4 are all full at 12:02 PM.

Quadrupling the resource extends the life of the resource by only two doubling times. When consumption grows exponentially enormous increases in resources are consumed in very short times.

5. THE LENGTH OF LIFE OF A FINITE RESOURCE WHEN THE RATE OF CONSUMPTION IS GROWING EXPONENTIALLY

Physicists would tend to agree that except for sunlight, the world's resources are finite. The extent of the resources is only incompletely known, although knowledge about the extent of the remaining resources is growing very rapidly. The consumption of resources is generally growing exponentially. Let us plot a graph of the rate of consumption $r(t)$ of a resource (in units such as tons per year) as a function of time measured in years. The area under the curve in the interval between times $t=0$ (the present, where the rate of consumption is r) and $t=T$ will indicate the total consumption C in tons of the resource in the time interval. This is stated mathematically:

$$C = \int_{t=0}^{t=T} r(t)\,dt \qquad (2)$$

If resource consumption follows Eq. 1, then the total resource consumed in the interval $t=0$ to $t=T$ is

$$C = \frac{r_0}{k}\left[e^{kT} - 1\right] \qquad (3)$$

If the known size of the resource is R tons we can determine the time T_e at which the resource will expire by substituting R for C, and T_e for T in Eq. 3.

$$R = \frac{r_0}{k}\left[e^{kT_e} - 1\right] \qquad (4)$$

We may solve this for T_e to obtain

$$T_e = \frac{1}{k}\ln\left[\frac{kR}{r_0} + 1\right] \qquad (5)$$

This equation is valid for all positive values of k and for those negative values of k for which the argument of the logarithm is positive. I suspect that Eq. 5 and its application to the resources of this nation and of the world constitute the best kept scientific secret of the century.

6. HOW LONG WILL OUR FOSSIL FUELS LAST?

The question of how long our resources will last is perhaps the most important question that can be asked in a modern industrial society. Dr. M. King Hubbert a geogphysicist with the United States Geological Survey in Reston, Va. is a world authority on the estimation of energy resources and on the prediction of their patterns of discovery and depletion. Many of the data used here come from Hubbert's reports. (4, 5). The three figures in this paper are redrawn from figures in his papers. These reports are required reading for anyone who wishes to understand the fundamentals and many of the details of the problem.

Table 2 gives statistics on production of crude oil in the United States.

TABLE 2

United States Crude Oil (lower 48 States)

Units are 10^9 barrels. (1 barrel=42 U.S. gallons=158.98 liters.)

Ultimate production	190
Produced to 1972	96.6
Percent of total production produced to 1972 percent	58.8
Annual production rate, 1970	3.29

Note that since one-half of our domestic petroleum has already been consumed, the "petroleum time" in the U.S. is one minute before noon. Figure 1 shows the historical trend in domestic production of crude oil. Note that from 1870 to 1929 the rate of production of domestic crude oil increased exponentially at a rate of 8.27 percent per year with a doubling time of 8.4 years. If the growth in the rate of production stopped and the rate of production was held constant at the 1970 rate, the remaining U.S. oil would last only 28 years.

TABLE 3

Life Expectancy in Years of Various Estimates of U.S. Oil Reserves for Different Rates of Growth of Annual Production

Units are 10^9 barrels.

This table is prepared by using Eq. 5 with r_0=3.29 B barrels per year. Note that this is domestic production which is only about one half of domestic consumption.

Col. 1 is the percent annual growth rate.

Col. 2 is the lifetime of the resource which is calculated using R=190–96.6=93.4 as the estimated oil remaining in the lower 48 states.

Col. 3 is the lifetime calculated using R=93.4+10 to include the Alaskan oil.

Col. 4 is the lifetime calculated using R=93.4+10+103.4 206.8 to include Alaskan oil and a hypothetical estimate of U.S. oil shale.

Col. 1	Col. 2 (years)	Col. 3 (years)	Col. 4 (years)
0	28.4	31.4	62.8
1	25.0	27.3	48.8
2	22.5	24.4	40.7
3	20.5	22.1	35.3
4	19.0	20.4	31.4
5	17.7	18.9	28.4
6	16.6	17.7	26.0
7	15.6	16.6	24.1
8	14.8	15.7	22.4
9	14.1	14.9	21.1
10	13.4	14.2	19.9

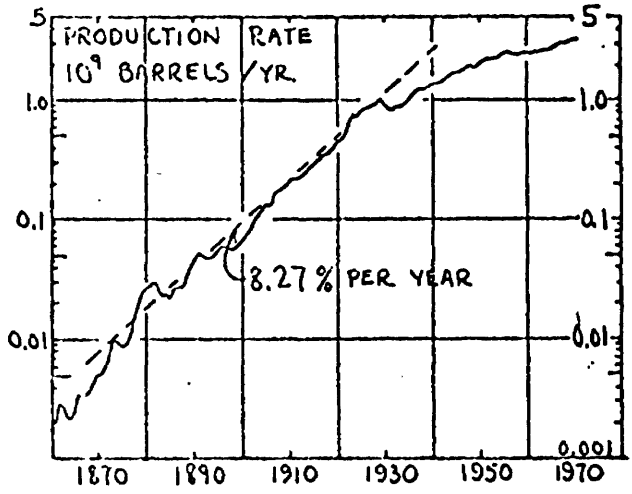

FIGURE 1.—History of crude oil production in the U.S. As the resource expires the production falls below the exponential straight line curve.

The vast shale oil deposits of Colorado and Wyoming represent an enormous resource. Hubbert reports that the oil recoverable under 1965 techniques is 80×10^9 barrels, and he quotes other higher estimates. In the preparation of Table 3, I used the figure 103.4×10^9 barrels as the estimate of U.S. shale oil so that the reserves used in the calculation of Col. 4 would be twice those that were used in the calculation of Col. 3. This table makes it clear that when consumption is rising exponentially, a doubling of the remaining resource results in only a small increase in the life expectancy of the resource.

Anyone who wishes to talk about energy self-sufficiency in the United States (Project Independence) must understand Table 3 and the exponential function upon which it is based.

Table 4 gives statistics on world production of crude oil.

TABLE 4

World Crude Oil, Data

Units are 10^9 barrels.

Ultimate total production (4)	1952
Produced to 1972	261
Percent of total production produced to 1972(4) ....percent	13.4
Annual production rate, 1970	16.7

Note that a little more than one-eighth of the world oil has been consumed. The "world petroleum time" is between two and three minutes before noon, i.e. we are between two and three doubling times from the expiration of the resource.

Fig. 2 shows the historical trend in world crude oil production. Note that from 1890 to 1970 the production grew at a rate of 7.04 percent per year, with a doubling time of 9.8 years. It is easy to calculate that the world reserves of crude oil will last 101 years at the 1970 level of production.

Table 5 shows the life expectancy of world crude oil reserves for various rates of growth of production and shows the amount by which the life expectancy is extended if one adds world deposits of oil shale. Column 4 is based on the assumption that the available shale oil is four times as large as the value reported by Hubbert. Note again that the effect of this very large hypothetical increase in the resource is very small.

TABLE 5

Life Expectancy in Years of Various Estimates of World Oil Reserves for Different Rates of Growth of Annual Production

Units are 10^9 barrels.

This table is prepared by using Eq. 5 with $r0=16.7$ barrels per year.

Col. 1 is the percent annual growth rate of production.

Col. 2 is the lifetime of the resource calculated using R=1691 as the estimate of the remaining oil.

Col. 3 is the lifetime calculated using R=1691+190=1881 representing crude oil plus oil shale.

Col. 4 is the lifetime calculated using R=1691+4(190)=2451 which assumes that the amount of shale oil is four times the amount which is known now.

Col. 1	Col. 2 (years)	Col. 3 (years)	Col. 4 (years)
0	101.0	113.0	147.0
1	69.9	75.4	90.3
2	55.3	59.0	68.5
3	46.5	49.2	56.2
4	40.5	42.6	48.2
5	36.0	37.8	42.4
6	32.6	34.1	38.0
7	29.8	31.2	34.6
8	27.6	28.8	31.8
9	25.7	26.8	29.5
10	24.1	25.1	27.5

From these calculations we can draw a general conclusion of great importance. When we are dealing with exponential growth we do not need to have an accurate estimate of the size of a resource in order to make a reliable estimate of how long the resource will last.

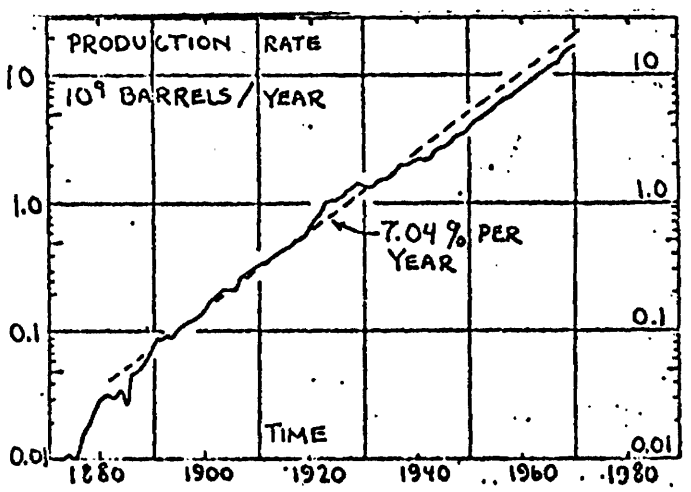

FIGURE 2.—History of world production of crude oil. The straight line shows exponential growth.

As the reader ponders the seriousness of the situation and asks, "what will life be like without liquid petroleum products?" the thought arises of heating homes electrically or with solar power and of traveling in electric cars. A far more fundamental problem becomes apparent when one recognizes that modern agriculture is based on petroleum-powered machinery and on petroleum-based fertilizers. This is reflected in a definition of modern agriculture.

Modern agriculture is the use of land to convert petroleum into food.

Item. "We have now reached the point in U.S. agriculture where we use 80 gallons of gasoline or its equivalent to raise an acre of corn, but only nine hours of human labor per crop acre for the average of all types of produce." (6)

It is clear that agriculture as we know it will experience major changes within the life expectancy of our students. With these changes could come a major fur-

ther deterioration of world-wide levels of nutrition; yet we still have people who proclaim that Malthus has been proven to be wrong!

It has frequently been suggested that coal will answer the U.S. and world energy needs for a long period in the future. What are the facts?

Table 6 shows data on U.S. coal production that are taken from several sources.

TABLE 6

U.S. Coal Resources

Units are 10^9 metric tons.

Ultimate total production (4):		
High estimate		1,486
Low estimate		390
Produced through 1972 (my estimate from Hubbert's fig. 22)		50
Percent of ultimate production produced through 1972		
Percent of high estimate	percent	3
Percent of low estimate	do	13
Coal resource remaining:		
High estimate		1,436
Low estimate		340
Annual production rate, 1972		0.5
Rate of export of coal, 1974		.06
Annual production rate, 1974		.6
Projected future rates of production:		
Annual production rate, 1980		1.3
Annual production rate, 1985		2.1

Figure 3 shows the history of coal production in the U.S. Note that from 1860 to 1910, U.S. coal production grew exponentially at 6.69 percent per year (T_2=10.4 years). The production then leveled off at 0.5×10^9 tons per year which held approximately constant until 1972 whereupon the rate started to rise steeply. The 1974 datum and the governmental goals for 1980 and 1985 are shown with crosses. Coal consumption remained level for 60 years because our growing energy demands were met by petroleum and natural gas. From the data of Table 6 we can estimate the average annual rates of growth of coal production as represented by the government's production goals.

TABLE 7

1974 to 1980	percent	13
1980 to 1985	do	9.6
1974 to 1985	do	11

Table 8 shows how long the two estimates of U.S. coal reserves will last for various rates of increase of the rate of production as calculated from equal 5.

TABLE 8

Lifetime in years of U.S. coal

The lifetime in years of U.S. coal reserves (both the high and low estimate) are shown for several rates of growth of production from the 1972 level of $0.5(\times10^9)$ metric tons per year.

	High estimate (years)	Low estimate (years)
0	2,872	680
1	339	205
2	203	134
3	149	102
4	119	83
5	99	71
6	86	62
7	76	55
8	68	50
9	62	46
10	57	42
11	52	39
12	49	37
13	46	35

We can see from Table 8 that even a modest exponential growth of the rate of consumption of coal will consume the "vast U.S. reserves" of coal in a very short time.

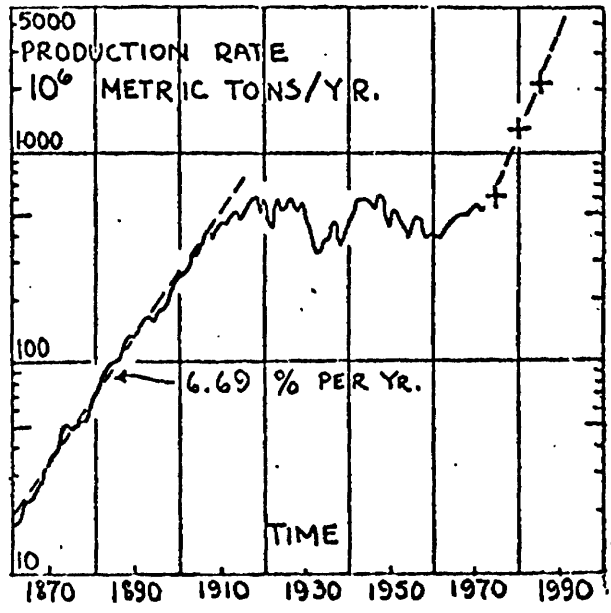

FIGURE 3.—History of coal production in the U.S. The three crosses in the upper right are the datum for 1974 and the production goals for 1980 and 1985.

7. WHAT DO THE EXPERTS SAY?

Now that we have seen the facts, let us examine what some branches of our federal government say about coal.

"It is clear, particularly in the case of coal, that we have ample reserves."

"We have an abundance of coal in the ground. Simply stated, the crux of the problem is how to get it out of the ground and use it in environmentally acceptable ways and on an economically competitive basis."

"At current levels of output and recovery these reserves can be expected to last more than 500 years." (7)

Here is one of the most dangerous statements in the literature. It is dangerous because news media and the energy companies pick up the idea that United States coal will last over 500 years.

While the media and the energy companies forget or ignore the important caveat with which the sentence began, at current levels of output——.

The right hand column of Table 8 shows that at zero rate of growth of consumption even the low estimate of the size of the U.S. coal resource "will last over 500 years", but if the government's initial plan of increasing coal production at an annual rate of 13 percent is maintained without change, then the low estimate of the U.S. coal resource, will be gone in 35 years. See Table 7.

It is absolutely clear that the government does not plan to hold coal production constant "at current levels of output."

"Coal reserves far exceed supplies of oil and gas, and yet coal supplies only 18 percent of our total energy. To maintain even this contribution we will need to increase coal production by 70 percent by 1985, but the real aim—to increase coal's share of the energy market will require a staggering growth rate" (8)

While the government is telling us that we must achieve enormous increases in the rate of coal production, other governmental officials are telling us that

we can increase the rate of production of coal and have the resource last for a very long time.

"The trillions of tons of coal lying under the United States will have to carry a large part of the Nation's increased energy consumption, says (the) Director of the Energy Division of the Oak Ridge National Laboratories"

"He estimated America's coal reserves are so huge, they could last 'a minimum of 300 years and probably a maximum of 1000 years' ". (9)

While we read these news stories we are bombarded by advertisements which say that coal will last a long time at present rates of consumption and which say at the same time that we must dramatically increase our rate of production of coal.

"At the rate the United States uses coal today, these reserves could help keep us in energy for the next two hundred years."

"Most coal used in America today is burned by electric power plants—(which)—consumed about 400 million tons of coal last year. By 1985 this figure could jump to nearly 700 million tons". (10)

Other advertisements stress just the 500 years (no caveat).

"We are sitting on half the world's known supply of coal—enough for over 500 years." (11)

Some ads stress the idea of self-sufficiency without stating for how long a period we might be self-sufficient.

"Coal, the only fuel in which America is totally self-sufficient." (12)

Other ads suggest a deep lack of understanding of the fundamentals of the exponential function.

"Yet today there are still those who shrill (sic) for less energy and no growth.

"Now America is obligated to generate more energy—not less—merely to provide for its increasing population."

"With oil and gas in short supply, where will that energy come from? Predominantly from coal. The U.S. Department of the Interior estimates America has 23 percent more coal than we dreamed of. 4,000,000,000,000 (trillion) tons of it. Enough for over 500 years." (the non-sentences are in the original) (13)

A simple calculation based on a current production rate of 0.6×10^9 tons per year shows that the growth in the rate of production of coal can't exceed 0.8 percent if the ad's 4×10^{12} tons of coal is to last for the ad's 500 years. Note that the 4×10^{12} tons cited in the ad is 2.8 times the size of the large estimate of U.S. coal reserves and is 12 times the size of the smaller estimate of U.S. coal reserves as cited by Hubbert.

We may wish that we could have rapid growth of the rate of consumption and have the reserves of U.S. coal last for a large number of years, but first-year college calculus is all that is needed to prove that these two goals are incompatible. At this critical time in our nation's history we need to shift our faith to calculations (arithmetic) based on factual data and give up our belief in Walt Disney's First Law (14) "wishing will make it so."

On the broad aspects of the energy problem we note that the top executive of one of our great corporations is probably one of the world's authorities on the exponential growth of investments and compound interest. However he observes that "the energy crisis was made in Washington." He ridicules "the modern-day occult prediction of "computer print-outs" and warns against extrapolating past trends to estimate what may happen in the future. He then points out how American free-enterprise solved the great "Whale Oil Crisis" of the 1850's. With this example as his data base he boldly extrapolates into the future to assure us that American ingenuity will solve the current energy crisis if the bureaucrats in Washington will only quit interfering. (15)

We have ads by a major power company telling us that "There is an increasing scarcity of certain fuels. But there is no scarcity of energy. There never has been. There never will be. There never could be. Energy is inexhaustible" (16) (Emphasis is in the original).

We can read that a professor in a school of mining technology offers "proof" of the proposition "Mankind has the right to use the world's resources as it wishes, to the limits of its abilities——" (17)

We have the opening sentence of a major scientific study of the energy problem, "The United States has an abundance of energy resources; fossil fuels (mostly coal and oil shale) adequate for centuries, fissionable nuclear fuels adequate for millenia and solar energy that will last indefinitely." (18)

We can read the words of an educated authority who asserts that there is no problem of shortages of resources, "It is not true that we are running out of

resources that can be easily and cheaply exploited without regard for future operations."

His next sentence denies that growth is a serious component of the energy problem. "It is *not* true that we must turn our back on economic growth" (emphasis is in the original).

Three sentences later he says that there may be a problem. "We must face the fact that the well of non-renewable natural resources is not bottomless." (19)

He does suggest that the lack of "leadership" is part of the problem.

We have the opening paper in an energy conference in which a speaker from a major energy company makes no mention of the contribution of growth to the energy crisis when he asserts that "The core of the energy problem both U.S. and worldwide" is "our excessive dependence on our two scarcest energy resources—oil and natural gas".

For him continued growth is not part of the problem, it is part of the solution. "More energy must be made available at a higher rate of growth than normal—in the neighborhood of 6 percent per year compared to a recent historical growth rate of 4 percent per year. (20)

And finally we note the Board Chairman of a major multinational energy corporation who concludes the discussion "Let's Talk Frankly About Energy" with his mild assessment of what we must do. "Getting on top of the energy problem won't be easy. It will be an expensive and time-consuming task. It will require courage creativeness and discipline——" (21)

When you compare the facts and the exponential calculations with the news stories, with the statements of public officials and with the statements in advertisements from energy companies, what can you conclude?

The only thing that is more distressing than the results of these exponential calculations is the observation that so few of our leaders, educators, policy makers, and "experts" have performed the calculations or show evidence of understanding the results.

8. AN EXPONENTIAL SOLUTION

The exponential function provides an interesting "solution" to the energy and resource problems. If we make the rate of production of a resource follow the curve

$$r(t) = r_0 e^{-(r_0/r)t} \tag{6}$$

the total production from now to infinity is exactly equal to the size R of the resource, (2) (22). We can use the resource and, have it last forever. This is the ultimate self-sufficiency. For the large estimate of U.S. coal, the production rate would have to decrease approximately 3 percent per century in order to assure that U.S. coal would last forever. The difficulty our nation would face with this declining rate of production can be expressed in the question, "Could we live one year from now with coal production at the rate it was a day and a half ago?" This program can be applied to any resource. If r_0/R for world petroleum is (1/101) then the decline in petroleum consumption would have to be—1 percent per year to make petroleum last forever.

The greatest act of responsibility which we could perform for our descendants for all time would be to put our consumption of coal and other resources on this declining curve. Not only is it proper to save some resources for those who will follow us, but it may make the difference in national self-sufficiency and ultimately of national survival.

9. WHAT DO WE DO NOW?

(1) We must educate all of our people to an understanding of the arithmetic and consequences of growth, especially in terms of the earth's finite resources. David Brower has observed that the promotion of growth is simply a sophisticated way to steal from our children.

(2) We must educate people to the critical urgency of abandoning our religious belief in the disastrous dogma that "Growth is good", that "Bigger is better", that "We must grow or we will stagnate" etc., etc. We must realize that growth is but an adolescent phase of life which stops when physical maturity is reached. If growth continues in the period of maturity it is called obesity or cancer. Prescribing growth as the cure for the energy crisis has all the logic of prescribing increasing quantities of food as a remedy for obesity or prescribing more cancer as the cure for cancer.

The occasion of our nation's 200th anniversary would be an appropriate time to make the transition from national adolescence to national maturity.

(3) We must conserve in the use and consumption of everything. We must outlaw planned obsolescence. (We must recognize that, as important as it is to conserve, the arithmetic shows clearly that improbably large savings from conservation will be wiped out in short times by even modest rates of growth. Conservation alone can not do the job).

(4) We must recycle almost everything. Except for the continuous input of sunlight the human race must finish the trip with the supplies that were aboard when the "spaceship earth" was launched.

(5) We must invest great sums in research to

(A) Develop the use of solar, geothermal, wind and tidal energy.

(B) Reduce the problems of nuclear fission power plants.

(C) Explore the possibility that we may be able to harness nuclear fusion and other sources of energy.

These investments must not be made with the idea that if they are successful they could sustain growth for a few more doubling times. They must be made with the goal that they could take over the energy load in a mature and stable society in which fossil fuels are used on a declining exponential curve that will let them last forever, and in which fossil fuels are no longer used to heat buildings but are saved for the much higher use as chemical raw materials.

(6) We must recognize that it is pseudoscience and false technology to promote ever-increasing rates of consumption of resources in the hope that science and technology will rescue us from the consequences of our self-centered folly. It is not acceptable to base our national future on the motto, when in doubt, gamble.

(7) We can not sit back and deplore the lack of "leadership" and the lack of response of our political system. In the immortal words of Pogo, "We have met the enemy, and they's us."

We are the leaders, and we are vital parts of the political system. Every one of us has access to dozens of other leaders who have not yet understood the problem. We must take the message to all the people in the spirit of education and service to which we are completely committed.

The arithmetic makes clear what will happen if we hope that we can continue to increase our rate of consumption of fossil fuels. Some experts suggest that the system will take care of itself and that growth will stop naturally, even though they know that cancer, if left to run its course, always stops when the host is consumed. My seven suggestions are offered in the spirit of preventive medicine.

10. CONCLUSION

The preceding calculations are offered as guideposts which must be understood by those who would deal constructively with the energy crisis. These scientific calculations must be viewed in the light of the words of Gustav Lebon (1841–1931), "Science has promised us truth an understanding of such relationships as our minds can grasp. It has never promised us either peace or happiness."

Perhaps the most succinct conclusion that is indicated by the anlysis above is, and again I use the immortal words of Pogo, "The future ain't what it used to be!"

The American system of free-enterprise has flourished for 200 years for the benefit of all mankind. Until recently it has flourished in a world of infinite resources. The challenge of the decades ahead is set forth clearly in the question, "Can free-enterprise survive in a finite world?"

Perhaps you can now appreciate why I say, The greatest shortcoming of the human race is man's inability to understand the exponential function.

11. POSTSCRIPT

In spite of the many times that they have been checked, it is always possible that I may have made an error in these calculations. Please review these calculations carefully and if you find errors please contact me at once so that I can make the necessary corrections—and apologies.

12. ACKNOWLEDGMENTS

Hundreds of conversations with dozens of people over six years have yielded many ideas, suggestions and facts which I have incorporated here. I offer my thanks to all who have helped in the evolution of these ideas.

13. REFERENCES

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(9) Associated Press story "Energy Head Stresses Coal Reserves" in the Boulder Daily Camera, July 5, 1975.

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(22) J. I. Shonle, "Environmental Applications of General Physics." Addison-Wesley Publ. Co., Reading, Mass., 1975, pg. 377.
(23) The cartoons are reproduced with the permission of the Washington Star Syndicate, Inc.

A. A. Bartlett (B.A., Colgate, 1944; Ph.D., Harvard, Physics, 1951) has been a member of the Colorado Faculty since 1950. He is currently Vice-President of the American Association of Physics Teachers.

Statement of Chrysler Corporation

There are several reasons why police patrol cars should be exempt from automobile fuel economy standards and taxes. Police cars need outstanding acceleration performance and high top speed to make traffic pursuits shorter, and thus safer for everyone on the road. These kinds of high performance pursuit cars need large displacement engines and high numerical axle ratios—the kind of equipment that lowers an automobile's fuel economy. Thus, a police vehicle that does the job effectively would fall into a high "gas guzzler" tax bracket. The consequence is that unless police cars receive special consideration, thousands of law enforcement agencies throughout the country could well end up paying anywhere from $9 million in 1980 to $37 million in 1985 in fuel economy penalties to buy the kind of pursuit vehicles that will serve the needs of the public.

Police patrol vehicles are figured into a manufacturer's fleet average under the present fuel economy law. That means that if a manufacturer builds the special vehicles needed by law enforcement agencies, under present law it could end up having to pay a penalty on all cars sold if the police cars pulled its fleet average below the minimum standard. In effect, the more cars we sell to police agencies to meet public needs, the more vulnerable we are to a strict tax or fuel economy penalty.

This is particularly true for Chrysler Corporation. We've been the number-one supplier of specialized police vehicles for a number of years, supplying over 50 percent of those purchased since 1962. Chrysler police car volumes for 1978 to 1980 in the United States are projected in the 20,000 range for pursuit vehicles. Total police-related volume is in the 32,000 unit range. If 16-17 mpg is assumed for pursuit cars versus a 1980 fleet requirement of 20 mpg, the penalty for Chrysler's whole fleet would likely be 0.1 mpg. This could result in a penalty of over $5,000,000 to Chrysler. A manufacturer with a large retail fleet could offer police vehicles with the same fuel economy and incur no penalty at all. (Attachment 1)

The federal government has recognized this problem in its own car purchases. Executive Order 12003, dated July 20, 1977, requires that the General Services Administration purchase cars whose average exceeds the required fleet average fuel economy by 2 to 4 mpg, but excludes from this Order automobiles for law enforcement work. (Attachment 2)

If state, county and city law enforcement agencies can't purchase the kind of high performance vehicles they need without a heavy tax or penalty, they could end up with new police pursuit cars with speed and performance inferior to that of many older cars on the road. It takes about 10 years for the car population to turn over in this country. That could mean a long-term handicap to highway law enforcement efforts.

We believe it is in the best interests of the public to exempt law enforcement vehicles from any kind of "gas guzzler" tax, and from the present fuel economy law as well. The exemption should be effective only for vehicles actually sold to law enforcement agencies for police patrol.

[Attachment 1]

Effect on Fleet Economy of Police Cars

For Chrysler Corporation:

Police-related cars Chrysler annual volume, 32,000.
Pursuant type annual volume, 20,000.

Pursuant estimated fuel economy (1980), 16–17 mpg.
Fleet Average Economy requirement (1980), 20 mpg.
Fleet Total volume (1976 model U.S. production), 1,050,000.
Effect of police pursuit cars on fleet, assuming fleet except police averaged 20 mpg and police economy of 16.5 mpg.

20 mpg	1,030,0000
16.5 mpg	20,000
Average (19.9195 mpg)	1,050,0000

Rounded average is 19.9 mpg.

Police effect on fleet, 0.1 mpg.

Penalty is $5 per car per 0.1 mpg below minimum required (50×1×1,050,000) ---------- 5,250,000

[Attachment 2]

TITLE 3—THE PRESIDENT

EXECUTIVE ORDER 12003—JULY 20, 1977

Relating to Energy Policy and Conservation

By virtue of the authority vested in me by the Constitution and the statutes of the United States of America, including the Energy Policy and Conservation Act (89 Stat. 871, 42 U.S.C. 6201 *et seq.*), the Motor Vehicle Information and Cost Savings Act, as amended (15 U.S.C. 1901 *et seq.*), Section 205(a) of the Federal Property and Administrative Services Act of 1949, as amended (40 U.S.C. 486(a)), and Section 301 of Title 3 of the United States Code, and as President of the United States of America, it is hereby ordered as follows:

SECTION 1. Section 1 of Executive Order 11912 of April 13, 1976, is amended to read as follows:

"Section 1. (a) The Administrator of General Services is designated and empowered to perform, without approval, ratification or other action by the President, the function vested in the President by Section 510 of the Motor Vehicle Information and Cost Savings Act, as amended (89 Stat. 15 U.S.C. 2010), In performing this function, the Administrator of General Services shall:

(1) Promulgate rules which will ensure that the minimum statutory requirement for fleet average fuel economy is exceeded (i) for fiscal year 1978 by 2 miles per gallon, (ii) for fiscal year 1979 by 3 miles per gallon, and (iii) for fiscal years 1980 and after by 4 miles per gallon.

(2) Promulgate rules which will ensure that Executive agencies do not acquire, subsequent to fiscal year 1977, any passenger automobile unless such automobile meets or exceeds the average fuel economy standard for the appropriate model year established by, or pursuant to, Section 502(a) of the Motor Vehicle Information and Cost Savings Act, as amended (15 U.S.C. 2002(a)); except that, such rules (i) shall not apply to automobiles designed to perform combat-related missions for the Armed Forces or designed to be used in law enforcement work or emergency rescue work, and (ii) may provide for granting exemptions for individual automobiles used for special purposes as determined to be appropriate by the Administrator of General Services with the concurrence of the Administrator of the Federal Energy Administration.

"(b) The Administrator of General Services shall promulgate rules which will ensure that each class of nonpassenger automobiles acquired by all Executive agencies in each fiscal year, beginning with fiscal year 1979, achieve for such fiscal year a fleet average fuel economy not less than the average fuel economy standard for such class, established pursuant to Section 502(b) of the Motor Vehicle Information and Cost Savings Act, as amended (89 Stat. 903, 15 U.S.C. 2002(b)), for the model year which includes January 1 of such fiscal year; except that, such rules (1) shall not apply to automobiles designed to perform combat-related missions for the Armed Forces or designed to be used in law enforcement work or emergency rescue work, and (2) may provide for granting exceptions for other categories of automobiles used for special purposes as determined to be appropriate by the Administrator of General Services with the concurrence of the Administrator of the Federal Energy Administration.".

Sec. 2. Executive Order No. 11912 of April 13, 1976, is further amended by adding the following new Section:

"Sec. 10. (a)(1) The Administrator of the Federal Energy Administration, hereinafter referred to as the Administrator, shall develop, with the concurrence of the Director of the Office of Management and Budget, and in consultation with the Secretary of Defense, the Secretary of Housing and Urban Development, the Administrator of Veteran's Affairs, the Administrator of Energy Research and Development Administration, the Administrator of General Services, and the heads of such other Executive agencies as he deems appropriate, the ten-year plan for energy conservation with respect to Government buildings, as provided by section 381(a)(2) of the Energy Policy and Conservation Act (42 U.S.C. 6361(a)(2)).

(2) The goals established in subsection (b) shall apply to the following categories of Federally-owned buildings: (i) office buildings, (ii) hosiptals, (iii) schools, (iv) prison facilities, (v) multi-family dwellings, (vi) storage facilities, and (vii) such other categories of buildings for which the Administrator determines the establishment of energy-efficiency performance goals is feasible.

"(b) The Administrator shall establish requirements and procedures, which shall be observed by each agency unless a waiver is granted by the Administrator, designed to ensure that each agency to the maximum extent practicable aims to achieve the following goals:

(1) For the total of all Federally-owned existing buildings the goal shall be a reduction of 20 percent in the average annual energy use per gross square foot of floor area in 1985 from the average energy use per gross square foot of floor area in 1975. This goal shall apply to all buildings for which construction was or design specifications were completed prior to the date of promulgation of the guidelines pursuant to subsection (d) of this Section.

(2) For the total of all Federally-owned new buildings the goal shall be a reduction of 45 percent in the average annual energy requirement per gross square foot of floor area in 1985 from the average annual energy use per gross square foot of floor area in 1975. This goal shall apply to all new buildings for which design specifications are completed after the date of promulgation of the guidelines pursuant to subsection (d) of this Section.

"(c) The Administrator with the concurrence of the Director of the Office of Management and Budget, in consultation with the heads of the Executive agencies specified in subsection (a) and the Director of the National Bureau of Standards, shall establish, for purposes of developing the ten-year plan, a practical and effective method for estimating and comparing life cycle capital and operating costs for Federal buildings, including residential, commercial, and industrial type categories. Such method shall be consistent with the Office of Management and Budget Circular No. A-94, and shall be adopted and used by all agencies in developing their plans pursuant to subsection (e), annual reports pursuant to subsection (g), and budget estimates pursuant to subsection (h). For purposes of this paragraph, the term "life cycle cost" means the total costs of owning, operating, and maintaining a building over its economic life, including its fuel and energy costs, determined on the basis of a systematic evaluation and comparison of alternative building systems.

"(d) Not later than November 1, 1977, the Administrator, with the concurrence of the Director of the Office of Management and Budget, and after consultation with the Administrator of General Services and the heads of the Executive agencies specified in subsection (a) shall issue guidelines for the plans to be submitted pursuant to subsection (e).

"(e) (1) The head of each Executive agency that maintains any existing building or will maintain any new building shall submit no later than six months after the issuance of guidelines pursuant to subsection (d), to the Administrator a ten-year plan designed to the maximum extent practicable to meet the goals in subsection (b) for the total of existing or new Federal buildings. Such ten-year plans shall only consider improvements that are cost-effective consistent with the criteria established by the Director of the Office of Management and Budget (OMB Circular A-94) and the method established pursuant to subsection (c) of this Section. The plan submitted shall specify appropriate energy-saving initiatives and shall estimate the expected improvements by fiscal year in terms of specific accomplishments—energy savings and cost savings—together with the estimated costs of achieving the savings.

(2) The plans submitted shall, to the maximum extent practicable, include the results of preliminary energy audits of all existing buildings with over 30,000 gross square feet of space owned and maintained by Executive agencies. Further, the second annual report submitted under subsection (g)(2) of this Section

shall, to the maximum extent practicable, include the results of preliminary energy audits of all existing buildings with more than 5,000 but not more than 30,000 gross square feet of space. The purpose of such preliminary energy audits shall be to identify the type, size, energy use level and major energy using systems of existing Federal buildings.

(3) The Administrator shall evaluate agency plans relative to the guidelines established pursuant to subsection (d) for such plans and relative to the cost estimating method established pursuant to subsection (c). Plans determined to be deficient by the Administrator will be returned to the submitting agency head for revision and resubmission within 60 days.

(4) The head of any Executive agency submitting a plan, should he disagree with the Administrator's determination with respect to that plan, may appeal to the Director of the Office of Management and Budget for resolution of the disagreement.

"f" The head of each agency submitting a plan or revised plan determined not deficient by the Administrator or, on appeal, by the Director of the Office of Management and Budget, shall implement the plan in accord with approved budget estimates.

"(g) (1) Each Executive agency shall submit to the Administrator an overall plan for conserving fuel and energy in all operations of the agency. This overall plan shall be in addition to and include any ten-year plan for energy conservation in Government buildings submitted in accord with Subsection (e).

(2) By July 1 of each year, each Executive agency shall submit a report to the Administrator on progress made toward achieving the goals established in the overall plan required by paragraph (1) of this subsection. The annual report shall include quantitative measures and accomplishment with respect to energy saving actions taken, the cost of these actions, the energy saved, the costs saved, and other benefits realized.

(3) The Administrator shall prepare a consolidated annual report on Federal government progress toward achieving the goals, including aggregate quantitative measures of accomplishment as well as suggested revisions to the ten-year plan, and submit the report to the President by August 15 of each year.

"(h) Each agency required to submit a plan shall submit to the Director of the Office of Management and Budget with the agency's annual budget submission, and in accordance with procedures and requirements that the Director shall establish, estimates for implementation of the agency's plan. The Director of the Office of Management and Budget shall consult with the Administrator about the agency budget estimates.

"(i) Each agency shall program its proposed energy conservation improvements of buildings so as to give the highest priority to the most cost-effective projects.

"(j) No agency of the Federal government may enter into a lease or a commitment to lease a building the construction of which has not commenced by the effective date of this Order unless the building will likely meet or exceed the general goal set forth in subsection (b) (2).

"(k) The provisions of this Section do not apply to housing units repossessed by the Federal Government.".

JIMMY CARTER.

THE WHITE HOUSE, *July 20, 1977.*

[FR Doc.77-21414 Filed 7-21-77;12:11 pm]

STATEMENT OF THE NATIONAL COAL ASSOCIATION

SUMMARY

1. The Administration is calling for an annual increase in coal production from 665 million tons to more than a billion tons by 1985. This must be accomplished in the face of formidable obstacles, including stringent new air quality requirements, the threat of unnecessarily restrictive surface mining requirements, proposed new mine health and safety requirements which do not contribute to improved health and safety, but which further reduce coal mine productivity, and complicated and protracted new federal leasing requirements.

2. The coal industry faces capital requirements that exceed by four to five times the industry's total capitalization. Estimates of new capital needed over the next ten years generally run $20 to $25 billion expressed in 1977 dollars.

The coal industry is currently capitalized at about $6 billion.

3. The coal industry is concerned that H.R. 6831 does not provide direct incentives to encourage investment in coal production when capital requirements are very large.

4. Legislation has been before the Congress to aid in raising capital needed to increase coal production. Most recently, in the 94th Congress, H.R. 6860, The Energy Conservation and Conversion Act, contained certain provisions to stimulate coal production and use, including:

Five-year amortization for deep-mining equipment;

Five-year amortization for equipment to process coal into synthetic fuels; and

Five-year amortization for coal slurry pipelines.

However, H.R. 6860 did not pass prior to adjournment of the 94th Congress.

5. Legislation should be passed in the current Congress which would provide a direct incentive to invest in expanded coal production.

Such legislation should provide for: (1) a 12-month write-off for new coal mining equipment; (2) 12-month amortization of coal conversion facilities, coupled with a price support program for synthetic fuels; and (3) extension of the cut-off point for depletion purposes for coal used in making low-pollutant synthetic fuels. (4) The "minimum tax" should be repealed as it applies to corpotions. From the coal industry's point of view it is a pronounced detraction from what incentive exists relative to the low 10 percent depletion allowed for coal. (5) The 10 percent depletion allowance for coal should be raised to the 15 percent allowed oil shale, which would still be substantially less than the 22 percent permitted uranium.

STATEMENT OF CARL E. BAGGE, PRESIDENT, NATIONAL COAL ASSOCIATION

My name is Carl Bagge. I am President of the National Coal Association, an organization which represents the Nation's leading coal producing companies, whose operations comprise more than half of the commercial production in the United States. In addition, we number in our associate membership machinery manufacturers, railroads, natural resource developers, financial institutions and coal consultants. I appreciate this opportunity to express the coal industry's views on the tax-related proposals of the Administration's energy legislation.

My comments will be restricted to the tax proposals, or more correctly, to the absence of any incentive proposals directly related to our industry.

The Administration is calling on the coal industry to increase annual production from 665 million tons to more than a billion tons by 1985. This goal is realistic if unnecessary constraints are avoided. Potential constraints that are of concern include:

1. On the demand side: stringent air quality requirements that are tighter than needed and that will be made even more restrictive under proposals before Congress.

2. On the supply side: surface mining laws that may prohibit mining of our most accessible coal even though reclamation is feasible; complicated new Federal leasing requirements which have severely protracted the procedures for obtaining coal leases; and proposed new requirements under the coal mine health and safety law that will not contribute to improved safety but will further reduce productivity in underground mines.

If these unnecessary impediments to increased coal production and utilization are overcome, one essential ingredient is still lacking—investment capital.

Current estimates of capital requirements vary. However, it is generally accepted in the coal industry and the financial community that capital requirements in the industry over the next ten years will range generally between $20 billion and $25 billion in current dollars, with some estimates going as high as $50 billion. Regardless what the actual figure is, the capital requirements are staggering for an industry with a current total capitalization of about $6 billion. It is for this reason that the coal industry is concerned about the lack of incentives for investment capital in Title II of H.R. 6831.

Nothing in the legislation would directly aid the coal industry in achieving the levels of production envisioned by the Administration.

A more favorable tax climate would both increase the likelihood of generating a greater amount of capital investment funds, and enhance the attractiveness of the industry as a sound, profitable investment.

Legislation to aid the coal industry in meeting its goal is not unfamiliar to the Congress. Bills to provide greater incentives have been introduced and discussed in past hearings. In addition, other proposals exist—all intended to provide greater financial stability to the coal industry.

In the 94th Congress, the House of Representatives passed H.R. 6860, the Energy Conservation and Conversion Act. It contained certain provisions that were intended to stimulate the production and use of coal. Most important to the coal industry was a provision that provided for a five-year amortization for deep-coal mining equipment, equipment to process coal into synthetic fuels, and for construction of coal slurry pipelines. Unfortunately the bill failed to pass the Senate before the Congress adjourned.

Part VI of H.R. 6831 would provide incentives, in the form of an additional tax credit, for certain "alternative energy property". With respect to coal, such properties include coal-fired boilers, or other combustors, and facilities to convert coal to synthetic gas. In addition, facilities where coal is used as a feedstock for the manufacture of chemicals or "other products" (other than coke) would qualify. Presumably "other products" could include synthetic oil or solid fuel, but the language is unclear. Both liquefaction and facilities for conversion to low-pollutant solid fuels should qualify. To avoid any controversy, this should be made clear in the language of the bill, by simply adding synthetic oil manufacturing facilities as a qualifying "alternative energy property" in Section 4998 of the bill.

It must be reemphasizeed that these incentive provisions do not apply directly to the coal industry, but rather to the utilization of coal. Nothing in the bill encourages investment in new mines and equipment, except the hope for an expanded market.

Legislation to assist the coal industry in financing expansion has been introduced on the House side and referred to the Ways and Means Committee. The particular bill would amend the Internal Revenue Code to provide for a 12-month write-off for new coal mining equipment. This bill recognizes the high costs of opening mines, the financial risks involved, and the cost of complying with health and safety requirements. Depending on physical conditions, the cost of putting a new mine into production may cost upwards of $40 or $50 per annual ton of production in today's dollars. Translated, this equates to 40 or 50 million dollars of investment before commercial production begins in a medium-sized one million ton a year mine.

I would like to suggest two additional measures which address the tax aspects of converting coal to low-pollutant synthetic fuels and which should be given serious and favorable consideration by the Congress. The first would provide for the amortization of coal conversion facilities based on a 12-month period. It would further establish a price support program for synthetic fuels produced from coal in recognition of the fact that these synthetic fuels would, even at today's price levels, be more costly than oil or natural gas. Legislation to accomplish this has been introduced in the House.

Our second proposal would further encourage the manufacture of low-pollutant, synthetic fuels made from coal by extending the cut-off point for depletion purposes by providing that conversion treatment processes shall be considered as mining.

Under present law if coal is processed to produce oil, gas, or solid low-pollutant fuel, such processing is considered beyond the valuation point for percentage depletion purposes. That is, for computing percentage depletion, the coal must be valued before it is converted to low-pollutant fuel. Existing law, however, does permit the processing oil shale to the point where it is equivalent in value to crude petroleum.

The Internal Revenue Code should be amended to permit, for percentage depletion valuation purposes, processing of coal into low-pollutant fuel—liquid, gas or solid. Thus, the same depletion valuation would apply to synthetic fuels from oil shale and synthetic fuels from coal. If coal is processed to remove pollutants, the valuation for depletion purposes would occur after such processing.

Coal and oil shale represent a large part of our total energy reserves. These fuels must be used to satisfy future energy demands if we are to reduce our dependence on natural gas and oil. Conversion of coal and oil shale to low-pollutant fuels should be encouraged because only when such conversion becomes a commercial reality will the United States be assured of a stable supply of energy.

Oil and gas from coal and oil shale will not completely supplant natural gas and petroleum, but merely supplement them in the very difficult task of meeting future energy needs. This is true because the cost of producing oil and gas from coal and oil shale is still higher than the current price of natural gas and oil. At some point, perhaps in the near future, the shortage of natural gas and oil and the increasing cost of finding new supplies will drive the price upward to a level where oil and gas from coal and oil shale will be competitive. New tax incentives related to conversion will hasten that day.

Our proposal would also cover processing of coal to produce a low-pollutant solid fuel. These processes should be encouraged because many utility and industrial plants have need for an environmentally acceptable solid fuel.

We urge the Finance Committee to give favorable consideration to these proposals in conjunction with the legislation now under consideration. Twelve-month amortization of mining equipment in particular, provides a measure of the stimulus needed by the coal industry. Alternatively, the coal industry should be permitted the additional tax credit for the purchase of mining equipment, as is proposed for other alternative energy equipment.

While we strongly endorse new legislation, such as that discussed above, to stimulate the production and utilization of coal, we have similar strong views regarding the impact of tax laws now in force with respect to our industry. We believe that one of the most counter-productive provisions in the Internal Revenue Code is that which gives rise to the so-called "minimum tax".

The "minimum tax" was originally conceived to insure that a select group of very wealthy individuals, who were able to avoid or substantially reduce normal tax liability by seeking out tax shelters, would be subjected to some measure of income taxation. As intended, and originally passed by the House in the Revenue Act of 1969, that end would have been accomplished. However, in the process of legislation, the provisions of the limitation on tax preferences (LTP) changed considerably. Ultimately, it came to apply to corporations as well as individuals, and encompassed a series of preferences" which were not part of the original Treasury package. Furthermore, it indiscriminately applies to all taxpayers whether or not the preference arises out of the principle business activities of the taxpayer or arises out of an activity purposefully singled out to shelter income from the taxpayer's principal business activity.

Contrary to apparent government policy, current law encourages companies whose activities create preference items to channel their capital into fully taxable enterprises, since the effect of a tax return on such income would be 40.8 percent rather than 48 percent. Conversely, companies not engaged in the extractive industries are encouraged to acquire companies engaged in such enterprises to reduce the penalties imposed on the extractive industries. In such circumstances, the very existence of the "minimum tax" creates a tax shelter opportunity.

From the coal industry's point of view, the "minimum tax" bears most heavily on the depletion allowance. It is a pronounced detraction from what incentive exists with respect to the depletion allowance. In the coal industry, or any other mining operation for that matter, there is already a restriction on the depletion allowance, since the depletion deduction is limited by the 50 percent of taxable income rule.

The 15 percent "minimum tax" is suspect as valid tax policy when applied only to individuals. As applied to corporations it is completely fallacious. It is a restriction on virtually all the attempts by the federal government to encourage business expansion through the tax system and should be repealed as it applies to corporations.

The greatest single encouragement to the coal mining industry—an increase in percentage depletion—has not yet been discussed. The Committee is fully aware of the arguments for increasing the allowance for coal. Basically it is a question of capital formation. The points discussed above relative to other incentives apply equally if not more so to increasing coal's depletion allowances to at least 15 percent, placing coal on an equal status with oil shale, but still well below the 22 percent permitted uranium.

The provision in the Code limiting the percentage depletion deduction to 50 percent of the taxable income from the property would prevent most coal producers from using a full 15 percent allowance, thus limiting the revenue impact. However, the prospect of utilizing the full benefits in years of greater profitability will help entice capital to this high risk industry.

In conclusion, we urge that H.R. 6831 be modified to include the positive incentives mentioned above for increased investment in coal.

The provision in the Code limiting the percentage depletion deduction to 50 percent of the taxable income from the property would prevent most coal producers from using a full 15 percent allowance, thus limiting the revenue impact. However, the prospect of utilizing the full benefits in years of greater profitability will help entice capital to this high risk industry.

In conclusion, we urge that H.R. 6831 be modified to include the positive incentives mentioned above for increased investment in coal.

PPG INDUSTRIES, INC.
Pittsburgh, Pa., July 26, 1977.

Subject: National Energy Act of 1977

Hon. RUSSELL B. LONG,
U.S. Senate, Washington, D.C.

DEAR SENATOR LONG: The National Energy Act as proposed by President Carter will have as far-reaching and fundamental an effect on our lives, communities, and businesses as any bill considered by Congress in the recent past. PPG Industries, Inc., recognizes the need for a workable national energy policy and supports the principle of conservation of fossil fuels and the improvement of our energy utilization habits. Conservation alone, however, will not solve our energy dilemma. For industry to continue to grow and supply needed jobs, it must be assured reliable energy supplies at affordable prices. Thus, while we generally agree in principle with the objectives of the Act, we believe they should include goals for increased fuel production and not rely on regulation.

PPG's principal concern with the Act is that it advocates the allocation of current fuel supplies rather than the development of additional energy alternatives. We believe the stated objectives of the energy bill should include goals for the increased production of oil, natural gas, nuclear energy, solar, and other energy sources; and these goals should be achieved without regulating fuel supplies.

Specifically:

1. PPG cannot operate its plants or keep our 36,000 employees working if we do not have the fuel supplies to operate. We may argue the pros and cons of fuel costs, but on supply there is no debate. PPG has invested approximately $30 million in oil and gas backup systems to ensure alternative fuel supplies.

It is our belief that the proposed legislation does not take adequate steps to assure that gas or oil is not shut off, resulting in plant shutdowns. Proper distribution of current fuels supplies to all energy consumers must be achieved to ensure continuing production.

2. I know you have heard it many times and in many ways, but PPG believes the only positive way to ensure adequate long-term fuel supplies is through decontrol of the pricing of new natural gas and oil and aggressive production and development of nuclear and other energy sources, as well as coal and solar. A free market system provides a conducive climate for such activities.

3. The concerns over electric rate design and regulatory policies, as stated in the Act gives cause for great concern. PPG fully supports electric utility rates based on the true cost of service for each class of customer and the principle that these rates be established at the state level. The policies proposed in the Act are confusing and vague, as well as unnecessary. Electric rates have been subject to much criticism lately, but this has been due to higher fuel costs and regulatory restrictions, not rate structure. We do not believe fuel conservation will result from social welfare programs introduced through arbitrary electric utility rate restructuring.

4. The proposed users taxes to force conversion from oil and gas and gas to coal are providing the ingredients for real horror stories. If we signed a contract today to convert boilers at one of our Gulf Coast facilities from gas to coal, it would take approximately five years to complete the changeover. The current bill does not adequately take into account the time required for such major boiler changes. As a result, we could be penalized tens of millions of dollars in "users" taxes during this five-year period, even though we had begun costly conversion activities, and there are no assurances that the supply of coal will be adequate to handle such industry conversions. The economics of conversion will be sufficient to cause conversion where this is justified.

5. Finally, petroleum and natural gas are raw materials used in the manufacturing of a great many essential products, and often, there is no viable alternative. Non-substitutable uses such as feedstocks and process fuels should be exempt from punitive taxes. These taxes could lead to unfair competitive situations

and, in many cases, unemployment due to withdrawal of the product from the marketplace.

In summary, I solicit your approval to bring order to a desperately needed, yet misdirected, national energy policy.

To help put our country back on a stable energy basis, we must:

(a) Initiate an immediate aggressive and comprehensive fuel conservation program.

(b) Eliminate the regulatory constraints to adequate supply and distribution of depletable fuel resources.

(c) Accelerate the development and production of alternate energy sources, such as nuclear and others, in addition to coal and solar.

(d) Support electric utility rates which reflect the true cost of service and are administered by state regulatory bodies.

(e) Oppose the users taxes and allow the free market system and economic incentives to cause the conversion to coal to the extent coal is available.

PPG realizes that the task of determining our nation's energy policy is complex and trying. We are very much concerned that action on the Act is progressing so quickly that adequate time is not allowed for evaluation of the consequences of these proposals.

Very truly yours,

J. E. BURRELL.

ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION,

Sacramento, Calif., August 3, 1977.

Hon. RUSSELL B. LONG,
Chairman, U.S. Senate Committee on Finance, 217 Russell Senate Office Building, Washington, D.C.

DEAR SENATOR LONG: Enclosed please find two suggested modifications to the coal conversion tax provisions contained in the President's National Energy Act for your consideration, as well as the supporting arguments for suggested modifications to the Plan. The proposed amendments would:

1. Expand the definition of and eligiblity for the "utility oil and gas conservation rebate" to include qualified utility investment in conservation measures which improve the efficiency of fuel use and/or reduced baseload and peak demand—many of which are more cost-effective means of reducing fuel use than replacing oil-fired boilers with coal-fired boilers; and

2. Require the IRS, after consultation with the Administrator of the Environmental Protection Agency and the appropriate state air pollution control authorities, to exempt electric utilities and major fuel-burning industrial installations in operation or permitted prior to April 20, 1977, from the oil and gas users tax if such facilities were precluded from using or converting to coal prior to that date by state or federal law or by an adopted State Implementation Plan required under the Clean Air Act.

These modifications to the tax provisions of the President's coal conversion program would allow for more effective implementation and would assure that the taxes designed to spur coal conversion will be directly linked to the feasibility of such conversions.

We would be grateful for the opportunity to testify on these issues when the Committee holds its hearings.

Sincerely,

RICHARD L. MAULLIN, *Chairman.*

Enclosures.

[Enclosure I]

SUGGESTED STATUTORY LANGUAGE FOR AMENDMENTS TO THE PROPOSED NATIONAL ENERGY ACT

(1) *Includes qualified utility investment in conservation measures which improve efficiency of fuel use and/or reduced power demand in the definition of eligible utility oil and gas conservation rebates.*

Amends Title II (Tax Provision), Part E [Oil and Gas Consumption Taxes (and Rebates)] of the President's proposed National Energy Act by amending section 1503 to add sec. 6432(c)(2)(a) as follows:

"2(a). Conservation Rebate. The term 'conservation rebate' means costs paid or incurred by an electric utility for engineering, designing, purchasing, trans-

porting, assembling and installing qualified conservation equipment which increases the efficiency of utility fuel use in a cost-effective manner, or which reduces demand for electricity in a cost-effective manner under regulations prescribed by the Secretary."

(2) *Requires the Internal Revenue Service to exempt certain users from the proposed oil and gas consumption taxes if such users were precluded from using or converting to coal prior to April 20, 1977, by state or federal law or by an adopted State Implementation Plan required under the Clean Air Act and establishes procedures for consulting with the Administrator of the Environmental Protection Agency and the appropriate state air pollution control authorities prior to disallowing applications for such exemptions.*

Amends Title II (Tax Provision), Part E [Oil and Gas Consumption Taxes (and Rebates)] of the President's proposed National Energy Act by amending sec. 4993 (Exemptions) (b)(7) to read as follows, *or* by amending the appropriate titles and sections of the House Ways and Means Committee draft as amended by Messrs. Ketchum and Corman as follows:

"(b) Exempted Uses. The taxes imposed by this chapter shall not apply to—

"(1) through (6) No change—

"Add (7) Use of petroleum and natural gas by any utility or other installation in operation or permitted prior to April 20, 1977, if such use was precluded from burning or converting to coal prior to that date by state or federal law or by an adopted State Implementation Plan required under the Clean Air Act. The Secretary of the Treasury shall establish procedures for consulting with the Administrator of the Environmental Protection Agency and the appropriate state air pollution control authority as to the economic feasibility of coal conversion given the degree of control required to meet all legally applicable federal and state air quality standards in effect prior to April 20, 1977, prior to disallowing applications for such exemptions."

[Enclosure II]

SUPPORTING ARGUMENTS FOR SUGGESTED MODIFICATIONS TO NATIONAL ENERGY PLAN

(1) *Includes qualified utility investment in conservation measures other than coal conversion to be eligible for oil and gas conservation rebates.*

The proposed utility oil use tax would add another $200–$300 million to ratepayers' bills. State regulatory commissions would have to decide whether or not to permit the utilities to pass through these additional costs. Potentially, the utilities could receive offsetting tax rebates through the "utility oil and gas conservation rebate," (section 1503) which would provide credits against "qualified replacement investments." The term "replacement" is not, however, clearly defined in the Act, and it is not clear how the Administrator would determine whether a given investment in capacity expansion, perhaps related to retirement of oil-fired capacity and perhaps not, would be treated for purposes of this rebate.

This interpretation of "replacement" is significant because, according to plans filed by the utilities with the California Energy Commission, the utilities are already planning on substantial reductions in oil-fired capacity and on increased reliance on coal. Oil currently provides nearly 60 percent of California's total generating capacity, at about 20,000 megawatts. Due to high fuel costs, over 1,000 megawatts of oil-, diesel-, and distillate-fueled capacity will be retired by 1985, and over 4,000 megawatts (about 10 percent of present total capacity and about 20 percent of present oil-fired capacity) will be retired by 1995. Coal-fired capacity is already projected to more than double by 1985, and to increase four-fold, to about 8,700 megawatts, by 1995. More than half of the increase in coal capacity is planned for out-of-state projects, which are affected both by federal and by other states' regulatory policies. Finally, the pressure to further expand coal-fired capacity could increase significantly, to the extent that the utilities' planned reliance on nuclear power for 60 percent of all new capacity additions over the next 20 years may prove to be unrealistic.

The proposed "utility oil and gas conservation rebate" is not a "conservation" rebate, but a "fuel-switching' rebate. As discussed above, it is questionable whether existing oil-fired equipment in California would qualify for the replacement rebate, which appears to have been designed and used for coal combustion. The costs of "replacement" in California could in many instances equal or even exceed the original installation cost of oil-fired boilers, with no increase in capacity. Qualified utility investments in conservation measures which would improve the efficiency of fuel use and/or reduce baseload and peak demand (insula-

tion, load management) should also be eligible for a true "conservation" rebate, which in many if not most cases would be a more cost-effective means of reducing fuel use than replacing oil-fired boilers with coal-fired boilers.

(2) *Exemptions from oil and gas consumption taxes where coal use or conversion is precluded.*

In the near term (the next ten years), it would be impossible to burn coal, using present technologies, in the Southern California air basins. In Northern California, where it may be possible, the first applications for in-state coal-fired power plants are expected from Pacific Gas and Electric Company this fall.

Conversion of existing oil-fired thermal electric generating plants to coal would be virtually impossible in the short term. California's existing oil-fired plants (about 20,000 megawatts) were designed to operate on oil and natural gas. Converting these plants to coal use would entail prohibitive costs—in the range of $5 billion—with no increase in capacity. During a one-to three-year conversion period, significant amounts of generating capacity would be off-line, possibly impairing reliability of service for extended periods of time. Environmental, land-use, transportation, and fuel supply factors would further complicate the conversion process.

The proposed modifications provide an equitable exemption for existing facilities which were precluded or prohibited from using coal due to air quality regulations. The Secretary of the Treasury has no independent capability to assess whether state or federal law precluded its use. The requirement for consultation with the EPA and state air pollution control authorities insures that no one is taxed on the one hand for not converting and prohibited on the other by a state or federal law.

EXECUTIVE CHAMBERS,
Honolulu, Hawaii, June 27, 1977.

Hon. RUSSELL B. LONG,
Chairman, Committee on Finance,
U.S. Senate, Washington, D.C.

DEAR SENATOR LONG: Title 1 of H.R. 6831, "The National Energy Act" proposed by President Carter, exempts Hawaii from provisions dealing with conversion to coal and other fuels. We believe that such an exemption is fully justified by Hawaii's distance from the U.S. Mainland and from foreign ports.

While the National Administration has recognized the insular character of our State, we note an inconsistency in Title 2, Part E, Oil and Gas Consumption Taxes, Section 4991, Consumption Tax. The specific provision reads:

"(a) *Imposition of Tax on Utility Use*—A tax is hereby imposed on any taxable utility use of petroleum during each calendar year if after the calendar year 1982 of 25c per million BTU used, plus the inflation adjustment pursuant to sub-section (c)(5) as applied by the secretary for the last calendar quarter preceding the year in which the tax liability is incurred."

If this provision is applied to Hawaii, it would mean that the average fuel bill to the customers of one major utility alone, the Hawaiian Electric Company, would increase by more than $14 million a year. Although we do not at present have data on the increased costs to be borne by other utility rate payers, it can readily be seen that the impact of a tax on utility use of petroleum would affect the Hawaiian economy most adversely.

The tax on utility use of petroleum is being proposed by the Administration as an incentive for utilities to convert to coal. Having recognized the merit to exempt Hawaii from converting to coal, the Act would be consistent in itself only if Hawaii's utilities are exempted from the tax on use of petroleum. We believe this oversight in Title 2 should be remedied by inserting in an appropriate part thereof, the same language as is found in Section 103 of Title 1, which reads: "The provisions of this act shall apply in the contiguous 48 states, Alaska and the District of Columbia."

Hawaii's utility companies have a disadvantage of not being able to interconnect with other utility companies as those on the U.S. Mainland are able to do. The option to reduce the use of petroleum and instead interconnect with other sources of fuel is not available to our utilities.

Accordingly, I respectfully urge that you assist us by exempting Hawaii's utilities from the tax provisions of H.R. 6381.

In making this request, we are yet mindful of the need to alleviate Hawaii's dependence on petroleum energy. A number of research and development projects have been initiated in Hawaii to investigate the use of geothermal, wind, solar,

biomass, and ocean thermal energy sources. Our actions are in harmony with the President's objective to convert eventually to virtually inexhaustible energy sources.

With warm personal regards, I remain,

Yours very truly,

GEORGE R. ARIYOSHI.

COMMENTS OF THE NATIONAL ASPHALT PAVEMENT ASSOCIATION

The National Asphalt Pavement Association represents 600 corporations engaged in the manufacture of hot-mix asphalt in the United States, 200 associate members who are engaged in various activities in support of the hot-mix asphalt industry, and approximately 60 international corporations from various countries who are also engaged in the manufacture of hot-mix asphalt.

NAPA and its members believe in the seriousness of the current energy situation, and we believe that the time for action is long overdue. We believe that through a program of sensible conservation of our energy resources and lowered dependence upon imported petroleum we can provide security for ourselves as a nation and avoid severe diminutions in our standard of living. However, conservation no matter how successful, is only a partial solution. Emphasis must be given to providing the necessary incentives for increased exploration, development and production of our energy resources.

We believe that there should be orderly price decontrol of all petroleum and petroleum products. We believe in a free market approach, as opposed to a centralized, bureaucratic approach using price controls, refinery yield formulas, rationing and the like to achieve our energy goals. Lifting all controls on oil would have the same result as the President's tax proposal—that of achieving domestic oil price partity with foreign oil. If decontrol would result in substantial unearned profits to the producers of domestic oil, it is suggested that a windfall profits tax be utilized, or other incentives be provided, so that these revenues could be channelled into new energy investments.

However, as long as regulations and controls are imposed on petroleum, specific considerations should be given to the repercussions they would cause the construction industry.

Because of the tremendous impact upon the highway industry which will be occasioned by the President's proposed crude oil equalization tax, these comments will relate exclusively to this issue.

The crude oil equalization tax (Part D, Sec. 1401 of S. 1472), designed to be phased in over a period of three years, will have the effect of raising the price of petroleum to the world market level by 1980. Because it is a tax on crude oil and not on specific products, prices will rise for all petroleum derivatives regardless of the ultimate use as either or building materials.

Although elsewhere in S. 1472 the Administration recognizes that the liquid asphalt residium is a non-energy by-product of the refining process, nowhere does it take into account this fact in its crude oi ltax equalization plan or rebate procedures.

Furthermore, although the proposed tax plan encompasses a system of rebates to consumers to offset the inflated prices occasioned by the tax, and although the Administration has stated that the oil tax would "provide no net gain to the Treasury and no net loss to consumers as a group," no procedures are advanced for including in such a rebate system compensation for consumers of nonenergy petroleum by products such as asphalt.

If the avowed purpose of the President's energy plan is to treat all segments of the economy and all consumers equally and fairly, action must be taken to include the purchasers of non-energy petroleum by-products in any rebate system.

Liquid asphalt is used as a raw material both in building construction (roofing) and highway construction and maintenance (paving). The overwhelming majority estimated 80 percent of purchasers of paving asphalt in the form of a finished road suface are federal, state and local governments. Their purchases are made from citizens' tax dollars and are used for public benefit. Tax inflated prices for these governmental purchases will severely reduce federal, state, and local budgets and result in a significant reduction of public programs and employment.

As stated previously, increased costs of road construction and maintenance must be absorbed by federal, state and local governments. Looking solely at the effect on federal and federal aid highway projects, the present proposal would amount to a tax by the federal government upon its own activities.

The figures below indicate a preliminary analysis of the cost increases on liquid asphalt occasioned by the imposition of the crude oil equalization: (Exhibit 1.)

Asphalt cement in dollars per ton

Year:	
1977	72
1978	86
1979	99
1980	120

Over 80 percent of the asphalt used within the U.S. goes into publicly financed streets and roads. These enormous material cost increases will mean a significant reduction, not only in highway projects, but also of construction jobs. Although a complete analysis of the impact of these taxes is not yet available, a ready comparison can be made to the repercussions caused by former President Ford's supplemental import fee program. In July of 1975, FHWA Administrator Tiemann reported to the F.E.A. that "the $2 fee on imported crude oil will increase the costs of . . . the national highway construction program by $3,500 per million dollars of construction, or an aggregate of $35 million for a yearly program of $10 billion." (Exhibit 2.)

Because the highway construction program is labor intensive, Administrator Tiemann also noted ". . . absorption of the additional costs . . . would require the elimination of 56 projects from the construction program, with the elimination of a total of 9,790 direct, indirect, and induced jobs per year." (Exhibit 2.)

The elimination of jobs to such a degree flies in the face of recently proposed legislation to create jobs in the construction industry.

To offset or avoid the budgetary constraints for federal and state highway programs occasioned by the crude oil equalization tax, NAPA recommends the following alternatives:

1. An exclusion or exemption of non-energy petroleum by-products, such as paving and roofing asphalt, from the crude oil equalization tax, or
2. An expansion of the proposed rebate system to compensate the governmental purchaser for his increased costs on such products. Rebates should be restored to the particular agency, department, or fund from whose budget the affected project payment was originally made.

It should be noted that President Carter has already proposed that compensation be given the various states to offset any reduced revenues which may result if conservation and tax efforts diminish highway funds for their states. Such compensation is to be made out of the Highway Trust Fund. The purpose of this is to allow states to avoid curtailing their road programs. NAPA's recommendations share the same goal. It is not proposed that rebates would be used to finance expanded highway programs; they are designed merely to retain the existing project levels.

The proposed tax plan also presents problems which are of particular import to the contract construction industry. Because road construction requires a long completion time, contracts are bid and let long before actual construction is begun. The governmental units who are the purchasers of the final product (a finished road surface) utilize fixed-price construction contracts (which do not generally allow for price-adjustment to offset higher costs). It is impossible for the individual contractor to foresee, and therefore to include in his bid price, the cost increase occasioned by possible governmental actions which affects the cost of his performance. Regardless of the unfavorable nature of the consequences of such events, the fixed-price contract does not allow for price adjustments under such circumstances. Thus individual contractors are forced to absorb all increased costs which may result from governmental actions or inactions.

The unique relationship between the individual contractor and the governmental purchaser possesses inherent inequities where the government as one party to the contract first binds a private contractor to perform a service at a given cost for a given return. Then the Government subsequently takes actions which raise the cost of performance unilaterally without providing for any relief or raising the original consideration it had offered.

This situation arises for contract work which is awarded prior to finalization or enactment of governmental policy which directly affects material costs. Once policy is set, the contractor can adjust his bid in a responsive manner. NAPA recommends that provisions be established, by law or regulations, to rebate to the contractor the increased cost of asphalt on fixed-price contracts bid or entered into prior to the implementation of any government energy tax plan which results in increased price for asphalt. Such rebates should be paid out of revenues generated by such energy taxes.

Study of Effect of President Carter's Energy Program on Cost of Asphalt Cement and Fuel Oil

By Charles R. Foster, Executive Vice President, Consulting and Research Services, Inc.

President Carter's energy program has four features that will affect the price of asphalt cement and fuel oil. They are:

1. Indefinite price ceilings of $11.28/bbl. on upper tier and $5.25/bbl. on lower tier oil.
2. Wellhead taxes on both upper and lower tier oil that will bring domestic crude to world prices by 1980.
3. Allow newly discovered oil to rise to 1977 world prices by 1980.
4. Remove controls on stripper oil.

I can compute the effect of the first two on asphalt and fuel oil prices, but I don't have information on the other two. Since my computations are based primarily on the corporate refinery crude oil acquisition prices, which include some high priced stripper oil, I would expect the computations to reflect the effect of stripper oil prices reasonably well.

For domestic crude oil, the refinery acquisition price has averaged about $0.50/bbl. above the wellhead price (source—FEA Monthly Petroleum Statistics reports). Refinery acquisition costs of imported crude is about 8 percent above posted world prices (source—comparison of FEA monthly reports with newspaper articles).

In previous studies, I have used a factor of 7 to convert per bbl. composite crude oil refinery acquisition costs to asphalt cement costs per ton (based on 5.6 bbl.'s per ton and 1.25 mark up). Competition seems to have made this figure a little high. For example, in the June 1976 FEA Monthly Petroleum Statistics Report (last one I have) the composite price of crude (Fig. 3) was about $10.50 in December of 1975. In February of 1976 (it took about two months for a crude oil price change to appear in asphalt prices in 1973–1974) the average of the posted prices of asphalt in the *Engineering News-Record* was $69.92 per ton, a factor of 6.66. In June of 1976, the composite price was $10.60/bbl., while in August the average for asphalt was $66.24/bbl., a factor of 6.25. In this study, I will use a factor of 6.5 instead of 7.

The factor for fuel oil prices I used before was one thirtieth of price of crude oil per bbl. This gives price of fuel oil per gallon. This is based on a 1.4 markup and 42 bbl.'s per gallon. I got this by comparing composite crude oil prices with fuel oil prices in *The Oil Daily*. I haven't made this comparison in about a year and don't have *The Oil Daily* so I can't check it. I will use the 1/30th in this study.

The NAPA report "*War on Waste*" indicates the price of imported crude is $13.50. I have added about 8 percent acquisition costs which gives $14.60 per bbl. for 1977. I believe imported oil prices will rise at about the rate of inflation and I have used 8 percent which gives $15.77 for 1978, $17.02 for 1979, and $18.39 for 1980.

The NAPA "*War on Waste*" also indicates the current percentage of imported crude is 43 percent. I have used this figure for 1977. I believe the percentage will increase over the next three years and I have used 44 percent for 1978, 45 percent for 1979, and 46 percent for 1980.

Percentages of imported and domestic oil based on the assumptions given above are as follows:

	Imported	Domestic
Year:		
1977	43	57
1978	44	56
1979	45	55
1980	46	54

The percentages of upper and lower tier oil can be computed from the crude oil wellhead price as reported by FEA in Figure 4 of the Petroleum Monthly Statistics Report. The last isue I have is dated June 1976. This showed upper tier wellhead prices at $11.75 per bbl., lower tier at $5.25 and domestic average at $8.05 per bbl. Letting x equal percentage of upper tier then

$$11.75\times+5.25\ 1-x)=8.05$$

and x=.43 indicating 43 percent upper tier and 57 percent lower tier oil. I think the percentage of lower tier oil will increase in the future and I have used 57

percent lower tier for 1977, 55 percent for 1978, 53 percent for 1979, and 50 percent for 1980.

Percentages of upper and lower tier oil are as follows:

	Domestic percent of of total	Upper tier		Lower tier	
		Percent of domestic	Percent of total	Percent of domestic	Percent of total
Year:					
1977	57	43	25	57	32
1978	56	45	25	55	31
1979	55	47	26	53	29
1980	54	50	27	50	27

President Carter's program would control the price of upper tier oil at $11.28/-bbl. with increases for inflation but would add a wellhead tax in 1980 that would bring upper tier to world prices. Using 8 percent inflation, plus $0.50/bbl. acquisition cost gives the following:

Lower tier refinery acquisition:	*Costs per barrel*
1977	11.78
1978	12.72
1979	13.74
1980	18.39 (equal to imported)

President Carter's program would keep the price of lower tier oil at $5.25/bbl. indefinitely subject only to escalation at the general rate of inflation. In addition, a wellhead tax would be added in three increments so that the price would be $11.78 (plus inflation) in 1979. With inflation at 8 percent per year, this would be $13.15. In 1980, the wellhead tax would bring the price to world prices. As I see it, lower tier oil prices plus wellhead tax would be as follows:

Lower tier refinery acquisition:	*Costs per barrel*
1977	5.78
1978	9.76
1979	[1] 13.74
1980	18.39

[1] (11.28+0.50)×1.08×1.08.

Refinery acquisition costs computed from the assumed percentages and costs given previously are shown in the following table.

Year	Imported			Upper tier			Lower tier			Composite refinery acquisition cost RAC
	Percent	Cost per barrel	Portion of RAC	Percent	Cost per barrel	Portion of RAC	Percent	Cost per barrel	Portion of RAC	
1977	43	14.60	6.28	25	11.78	2.95	32	5.78	1.84	11.07
1978	44	15.77	6.94	25	12.72	3.18	31	9.76	3.03	13.15
1979	45	17.02	7.66	26	13.75	3.57	29	13.74	3.98	15.21
1980	46	18.39	8.46	27	18.39	4.97	27	18.39	4.96	18.39

Conversion of the composite refinery acquisition costs to cost of asphalt cement and fuel oil are as follows. Numbers are rounded off to nearest dollar for asphalt and cent for fuel oil.

	RAC	Asphalt cement (dollars per ton)	Fuel oil (cents per gallon)
Year:			
1977	11.07	72	37
1978	13.17	86	44
1979	15.21	99	51
1980	18.39	120	61

Actually, the effect of the wellhead tax on the refinery acquisition cost is not as large as might be expected. I computed the composite crude oil refinery acquisition cost with the same percentages of imported and domestic oil and with 8 percent inflation but with no wellhead tax. These are shown in the following table.

Year	Imported			Upper tier			Lower tier			Composite refinery acquisition cost RAC
	Percent	Cost per barrel	Portion of RAC	Percent	Cost per barrel	Portion of RAC	Percent	Cost per barrel	Portion of RAC	
1977	43	14.60	6.28	25	11.78	2.95	32	5.78	1.84	11.07
1978	44	15.77	6.94	25	12.72	3.18	31	6.24	1.93	12.05
1979	45	17.02	7.66	26	13.74	3.57	29	6.74	1.95	13.18
1980	46	18.39	8.46	27	14.83	4.00	27	7.28	1.97	14.43

Comparison with the preceding table shows the wellhead tax will add about $1 to the composite refinery acquisition cost in 1978, $2 in 1979, and $4 in 1980.

EXHIBIT 2

U.S. DEPARTMENT OF TRANSPORTATION,
FEDERAL HIGHWAY ADMINISTRATION,
Washington, D.C., July 10, 1975.

Hon. FRANK G. ZARB,
Administrator, Federal Energy Administration,
Washington, D.C.

DEAR MR. ZARB: The June 1, 1975, increase in supplemental license fee from $1 to $2 per barrel of imported crude oil will have a serious negative impact on the national program for highway construction and maintenance. The increased fee is being reflected in higher prices that highway agencies are required to pay for products derived from the imported crude oil—gasoline, diesel fuel, and asphalt. The supplemental fee, in effect, will result in a significant decrease in the amount of important highway work that can be carried out, and the loss of an appreciable number of jobs, as highway construction and maintenance activities are labor intensive. We believe it is in the national interest for the Federal Energy Administration to provide a measure of relief by reducing or refunding the supplemental fee on imported crude oil refined into products used in highway work. The following information is offered in support of this request.

The sharp escalation in the prices of petroleum products needed for the Nation's highway construction and maintenance programs has already inhibited the volume of essential highway work that must be performed, and the recent increase in the supplemental license fee on imported crude oil further aggravates the severely inflationary situation existing with regard to highways. Since 1967 inflationary forces have more than doubled the cost of highway construction.

The increase in prices is particularly striking for asphalt, a non-energy product. Over 80 percent of asphalt used in this country goes into publicly financed roads and streets. The price of asphalt has gone up from about $20 a ton prior to 1972 to the current price of about $69 a ton, a 345 percent increase.

Uncertainties as to the prices that highway agenices and highway construction contractors have to pay for fuels and for asphalt have caused potential bidders to not bid at all or to submit excessively high bids to minimize the risk of serious losses likely to be incurred by unpredictable future period rises.

We estimate that the $2 supplemental fee on imported crude oil will increase the cost of asphalt used in the national highway construction program by $3,500 per million dollars of construction, or an aggregate of $35 million for a yearly program of $10 billion.

We estimate that the $2 supplemental fee on imported crude oil will increase the cost of fuels used in the highway construction program by $4,000 per million dollars of construction, an aggregate of $40 million a year for the highway construction program of $10 million.

If the present overall level of spending for highway construction at all governmental levels is to be maintained, absorption of the additional costs for asphalt and fuels of $75 million would require the elimination of 56 projects from the construction program, with the elimination of a total of 9,790 direct, indirect, and induced jobs per year.

With regard to highway maintenance programs, the effect of increased prices for fuel and asphalt is equally profound as the governmental agencies responsible

for preserving the tremendous investment in roadways and for maintaining the safety and capacity of highways must use large quantities of fuels and asphalt.

A recent survey by the American Association of State Highway and Transportation Officials and the Federal Highway Administration indicates that even without an actual reduction in maintenance budgets, many States are compelled to reduce the amount of work they expected to perform, largely because of the abnormal increase in costs of materials. The 1974 prices of materials needed for highway maintenance, principally fuels and asphalt, increased 30.7 percent over the previous year. Of the 44 States reporting, 37 reduced operations to some extent and 23 had what we consider to be major cutbacks. Especially disturbing is the fact that 11 States have been compelled to postpone major resurfacing, overlay, and patching programs. Since highways deteriorate rapidly when not properly maintained, delays in essential work resulting from the inability of highway agencies to purchase adequate quantities of required materials will seriously affect the integrity of the roadways and the safety of highway users.

In the light of the adverse impact of the $2 per barrel supplemental import fee on crude oil upon highway construction and maintenance activities, and the need to sustain and to generate employment in our national economy, we urge the Federal Energy Administration to take immediate action to reduce or refund the supplemental fees imposed on imported crude oil refined into products used in the construction and maintenance of public highways.

Sincerely yours,

NORBERT T. TIEMANN,
Federal Highway Administrator.

EXHIBIT 3

WASHINGTON STATE COUNTY ROAD ADMINISTRATION BOARD,
Olympia, Wash., July 12, 1977.

Re: proposed new wellhead tax

Congressman MIKE MCCORMACK,
Federal Building,
Richland, Wash.

DEAR CONGRESSMAN MCCORMACK: Carl Minor, of our state's Asphalt Paving Association, called late last week to inform us that one of the proposals in President Carter's energy package now up for consideration in the Congress is to impose a new wellhead tax on petroleum. According to his information, this would cause the price of asphalt in our state to rise from its present level of $60–$70 per ton to a new level of about $120 per ton. He was interested in knowing what effect this proposal would have on the counties of the Fourth and Fifth Congressional Districts.

We made a quick survey by contacting most of the county engineers in eastern Washington and Clark and Skamania Counties to get some information about their minimum asphalt needs. We found that the total asphalt needs, to meet minimum requirements in these 22 counties, would be approximately 46,000 tons annually. Using an estimated increase in price of $50 per ton for asphalt, this would result in an added cost of approximately $2,300,000 annually. Estimated asphalt needs and resulting costs for all county roads in the state would be at least three times the amount determined for the 22 counties surveyed, or somewhere in the neighborhood of eight to nine million dollars per year. This is just about equal to the amount of additional funding that counties are expecting to receive as a result of the variable gas tax recently passed by the State Legislature.

County road programs have already been cut back substantially in the last several years because of rapidly increasing costs, so if a new wellhead tax were to cancel out the additional revenue produced by the new gas tax, we would gain nothing. In fact, now that the variable gas tax has been challenged by an initiative and will be on the ballot in November, a reversal of the Legislature's action by the voters could create disasterous problems in some of our counties.

As an example of the actual dollars involved, our survey indicates that the additional annual cost of a $50 per ton increase in the cost of asphalt, in Clark County, would be almost $300,000; in Grant County $180,000; in Spokane County $365,000 and in Yakima $225,000.

To sum it all up, I think I can safely say that the county officials of our state would urge you to exempt road asphalt from the new wellhead tax or devise some

method by which a rebate could be made so that the tax, in effect, would be cancelled out. The proposal as it now stands, if we understand and interpret it correctly, simply spells disaster for county road departments.

Very truly yours,

ERNEST GEISSLER, P.E., *Director.*

EXHIBIT 4

NATIONAL ASSOCIATION OF COUNTIES,
Washington, D.C., August 4, 1977.

RESOLUTION ON ASPHALT

Whereas, 93 percent of all paved highways are presently paved with asphalt and at present asphalt is the only material of practical use in repair and maintenance of these highways; and

Whereas, states, counties, and cities are responsible for maintenance and repair of these highways and streets; and

Whereas, asphalt, a derivative of crude oil, will be directly impacted by energy conservation proposals currently before the Administration and Congress and could double or triple in cost as a direct result of such proposals; and

Whereas, such proposed measures would cause severe financial constraints on states, counties, and cities; therefore, be it

Resolved That the National Association of Counties urges that: any proposals aimed at conserving energy specifically exempt asphalt from any tax or other measure which would further increase the cost of this material; or that any tax imposed which directly impacts the price of asphalt be rebated to states, counties or cities which use or contract for the use of asphalt in the construction, repair, reconstruction or maintenance of highways and streets.

Adopted July 26, 1977, Wayne County (Detroit) Mich.

SIERRA CLUB,
Washington, D.C., August 17, 1977.

Hon. RUSSELL B. LONG,
Chairman, Senate Committee on Finance,
Dirksen Senate Office Building,
Washington, D.C.

DEAR SENATOR LONG: Title II of the National Energy Act, S. 1472, is of widespread interest to environmental and conservation organizations. Decisions which Congress makes regarding S. 1472 will have important implications for the quality of our Nation's environment in the years ahead. We believe that energy conservation and a shift to renewable energy resources must be the cornerstones of a responsible energy policy.

We urge that the Finance Committee recommend tax provisions in S. 1472 which will result in energy savings equal to, if not surpassing, the goals proposed by President Carter. We ask that this statement be included in the hearing record on S. 1472 and circulated to members of the Committee for their consideration.

Energy policy and environmental protection are inextricably linked. Faulty energy decisions will lead inevitably to increased pollution, damage to ecological values and public health, and adverse economic impacts. A philosophy of "production at any cost" would eradicate many of the environmental gains of recent years, destroy the scenic and recreational values of our pubic lands, and deplete finite energy resources which the Nation must hold in trust for future generations.

The comprehensive energy policy announced by President Carter on April 20 addressed legitimate energy needs without abandoning environmental concerns. Likewise, S. 1472:

Properly emphasizes energy conservation—in homes, industry, and on the Nation's highways.

Recognizes that prudent economic policy requires that depletable energy resources be priced at their replacement cost so as to discourage wasteful use.

Avoids subsidies for new, expensive, and environmentally-destructive energy technologies.

Contains incentives for development and increased use of renewable energy technologies.

Is consistent with other social goals, including maintenance of a healthy economy and equitable distribution of benefits and burdens.

Energy conservation is just as much a supply option as an oil well. When energy can be "produced" more cheaply through conservation than through other supply technologies, national policy should encourage these investments. In addition, conservation facilitates an orderly transition to the renewable energy technologies which should be our long-term objective, and which are compatible with environmental objectives.

We are seriously troubled by suggestions in recent Committee hearings that development of oil shale, nuclear power, synthetic fuels and the like can solve our energy problems. The potential environmental, health, and safety problems associated with these technologies are frightening to contemplate. We believe that agressive conservation programs and swift development of solar and other renewable technologies are more sensible programs. Government subsidies for energy production hinder progress toward a future based on renewable resources and are not consistent with the goal of environmental protection.

In its consideration of S. 1472, we particularly urge the Finance Committee to take the following actions:

1. Strengthen the gas guzzler excise tax and support related gasoline conservation provisions. The gas guzzler tax originally proposed by President Carter was significantly weakened in H.R. 8444. In addition, the 3- to 4-mile-per-gallon "window" provided before application of the tax has been widened to as much as 5.5 mpg by the recent promulgation of fuel economy standards by Secretary Adams. The Finance Committee should completely close the tax exemption window and apply the tax to any vehicle not meeting fleetwide standards under the Energy Policy and Conservation Act of 1975.

The Committee should assure that light duty trucks are covered by the gas guzzler tax and should remove the deduction of state gasoline taxes from the federal income tax. Revenues from the gas guzzler tax should be earmarked for public transportation programs which are not presently adressed in the proposed legislation. Finally, the gasoline tax for motorboats and the tax on general aviation fuel proposed in S. 1472 should be maintained.

2. Support the crude oil equalization tax as proposed in S. 1472. The oil equalization tax is an effective mechanism to price oil at its true replacement value, while at the same time capturing windfall profits. The incremental cost increases will produce a certain conservation incentive, while not creating an overwhelming burden for consumers.

We support the per capita rebate concept proposed by President Carter as a progressive approach to alleviating some of the burdens of higher energy prices. We strongly oppose any attempt to provide a tax credit for plowback investment against the equalization tax. We likewise oppose creation of any type of energy production trust fund with equalization tax revenues.

3. Support tax credits for residential energy conservation and solar energy improvements. We believe that avariety of incentives are needed to spur maximum energy conservation.

The schedule of tax credits proposed by President Carter supplements the grant and loan program already recommended by the Senate Energy and Natural Resource Committee. We urge enactment of both programs by the Finance Committee.

We look forward to working with you and other Finance Committee members as you deal with this important legislation.

Yours sincerely.

Pamela Deuel, Environmental Action; Philip Mause, Attorney for Environmental Defense Fund; Garry DeLoss, Environmental Policy Center; Jeffrey Knight, Friends of the Earth; Edward Strohbehn, Natural Resources Defense Council; Jonathan Gibson, Sierra Club; William K. Reilly, The Conservation Foundation.

STATEMENT OF THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

The Associated General Contractors of America is a national trade association representing 8,500 general contractors engaged in all aspects of general construction. Our member firms perform about 60% of the annual contract construction volume in the United States.

The construction industry is our nation's largest industry, employing approximately five million workers, approximately 3.5 million of whom are employed

directly on construction job-sites. The construction industry accounts for approximately 10 percent of the gross national product each year. One of every seven Americans earns his or her living, directly or indirectly, from construction.

The construction industry is characterized by its competitive nature, which stems directly from the competitive bidding system under which it operates. Under the competitive bidding system, a construction contractor commits himself to delivering a finished product, within a prescribed time, at a fixed price. In the public sector, virtually all construction procurements are competitively bid, fixed-price contracts. In addition, public works construction contracts are often long-term contracts—with completion times ranging from one to four years. These contracts are usually bid on, and awarded, from several months to a year prior to the actual commencement of construction.

Construction contractors must be able to adequately analyze, price and deal with the uncertainty of future marketplace events in preparing their bids on long-term fixed-price construction contracts. A contract by definition, is an agreement which allocates risk; and construction contractors have historically accepted and assumed certain risks inherent in the construction industry—price fluctuations, weather variables, labor difficulties, supply disruptions, etc.—in essence, all future conditions induced by and brought about through the marketplace.

It is impossible, however, for construction contractors to predict, and therefore include in their bid prices, increased costs resulting from unexpected governmental actions. This, coupled with the fact that fixed-price contracts almost exclusively do not allow for price adjustments under such circumstances, places the construction contractor who has made a long-term fixed-price contract commitment prior to the announcement or imposition of a governmental proposal resulting in increased costs to that contractor, in an obviously critical situation. He must, by the terms of his contract with the government, absorb these increased costs.

The proposed standby gasoline and domestic crude oil equalization taxes will dramatically increase the price of petroleum and derivative products—specifically gasoline, diesel fuel and asphalt. It is clear that the resultant cost impact on contractors committed to long-term, fixed-price construction contracts will be substantial. We believe that if the Federal government proposes to substantially increase the price of petroleum and derivative products through selective taxation, it is essential that provisions be established to either exempt construction contractors who have bid on or entered into fixed-price contracts prior to the imposition of such taxes, or to rebate to those contractors the resultant increased costs of these products. Failure to do so will result in the inequitable situation of the Federal government binding contractors to perform a service at a given price, and then unexpectedly and significantly increasing the cost of contract compliance.

As a trade associate representing general contractors, we are also concerned with the inflationary impact these taxing proposals will have on future construction costs; particularly in those construction activities which make use of asphalt. Our projections indicate that the proposed crude oil equalization tax will result in the price per ton of asphalt approximating $115 per ton by 1980, as compared to an average 1980 price per ton of approximately $90 without the tax.

Higher asphalt prices, however, will have no useful energy conservation effect. Asphalt is a non-energy derivative of petroleum, used primarily as a vital and non-replaceable raw material in construction. Its consumption rate, once established by design criteria, is inelastic and cannot be reduced through the price mechanism. Its continued use as a basic raw material of construction will be required, regardless of price.

Asphalt is uniquely different from the other portions of a barrel of crude and it should be treated differently than those other portions. A strong and justifiable argument can be made for exempting that portion of the barrel of crude that is refined into asphalt, from the proposed domestic crude oil equalization tax.

There clearly are precedents for such an asphalt exemption. Previous Administrations, and even the present Administration, have already recognized the uniqueness of asphalt: asphalt has never been included under price and allocation controls; imports of finished asphalt were exempted from the supplemental fees placed on imported crude oil by the previous Administration; and, indeed, that section of the National Energy Act which proposes an oil consumption tax, specifically declares that asphalt is a non-taxable use of petroleum for the purposes of that section.

Should asphalt not be exempted from the proposed crude oil equalization tax, Federal, state and local governments will be forced to receive much less construc-

tion for their ever-shrinking construction dollar—particularly in the areas of highway construction and maintenance. This could lead to the cancellation of many already-delayed and badly-needed public works projects—projects that are labor-intensive in nature and vital to our nation's continued economic recovery.

STATEMENT OF EDWARD W. STIMPSON, PRESIDENT, GENERAL AVIATION MANUFACTURERS ASSOCIATION

The General Aviation Manufacturers Association, an independent trade association representing 38 U.S. companies that manufacture general aviation aircraft, engines, avionics and component parts, appreciates the opportunity to comment on the tax aspects of the energy legislation now before the Finance Committee. We urge your Committee to reject the new 4 cent tax on general aviation fuel, as was done by the House of Representatives. This tax will only increase the cost to the user and not achieve energy savings.

Our industry is in complete agreement with the objective of fuel conservation. Fuel consumption and fuel conservation has always been a major design parameter for general aviation aircraft and engines. Competititve factors in the market place, coupled with recent energy shortages have accentuated the necessity for making general aviation aircraft even more fuel efficient, since current aviation engines depend entirely upon petroleum and must do so for as long as we can see clearly in the future.

Major educational efforts have been underway in the general aviation community to educate pilots how to operate their aircraft in the most efficient manner. Much has been done in this regard and efforts are continuing.

In addition, the manufacturing industry is actively participating in campaigns to reduce in-plant energy consumption. Since 1972, the industry has been able to reduce in-plant energy consumption by 23%.

Currently, the general aviation user pays into the Airport/Airway Trust Fund, a 7 cent per gallon federal fuel tax on all general aviation fuel. This is in addition to numerous State and local taxes.

Of the total hours flown in general aviation, approximately three-fourths are for business and commercial purposes, with the remainnig one-fourth for personal uses.

Of the total fuel used in transportation, general aviation consumes 0.7 of 1 percent. Of the total fuel used in aviation, general aviation uses about 6 percent. This was reiterated in the recent report of the Comptroller General to the Congress which stated the proposed 4 cent tax on general aviation fuel would not significantly affect total transportation energy use, "since general aviation accounts for only a small part of aviation fuel consumption."

Approximately 100 million people, or 1 out of 3 intercity passengers, are transported each year by general aviation aircraft. General aviation serves all 13,000 airports in the United States, while the commercial airlines serve about 400.

The general aviation industry has consistently maintained that the industry should be treated fairly and equitably along with other users of petroleum products. This principle was established in the Emergency Energy Petroleum Act of 1975.

We would urge that any action taken by the Committee recognize that general aviation is an important element of the national transportation system. We respectfully urge that the Congress reject the proposed four cent tax.

STATEMENT OF MAX R. DODSON, PRESIDENT AND CHIEF EXECUTIVE OFFICER, LONE STAR STEEL CO.

Enactment of a tax on the industrial use of natural gas, as proposed in the National Energy Plan, would be most disruptive to Lone Star Steel, and its customers. Because practically none of our energy usage could be converted from oil or natural gas in the one-year time period alloted, we would have no alternative but to pay millions of dollars in usage taxes. To the extent competitive conditions would allow, we would substantially increase prices to our customers—customers who, since much of our production is in tubular goods for the oil industry, help meet this nation's energy needs by producing, recovering, and transporting oil and natural gas. Unfortunately, as current market condi-

tions and rapidly increasing domestic costs have shown, imported steel pipe from Japan and other countries would take a bigger share of the U.S. and world market.

Ironically, the legislation would also erode our capital and cash flow positions to the point that it could jeopardize our commitment to proceed with plans made several years ago to convert almost all of our energy usage to coal-produced electricity by the end of 1983. To tax us on our use of natural gas or fuel oil during an interim period when we can use nothing else, and thus to impede our ability to convert to another energy source as soon as possible, makes no sense. In fact, it is counterproductive.

Fortunately, the House of Representatives recognized this injustice and exempted from tax those process uses of natural gas or fuel oil for which there is no reasonable alternative. There are many problems, however, with the House solution, not the least of which is continuing uncertainty as to which, if any, of our uses would be taxed. We would be placed in the hands of the Secretary of the Treasury and would not know where we stood until he had considered and ruled upon thousands upon thousands of process uses throughout industry. Additionally, the Secretary would be required to monitor on a perpetual basis all technical advancements, efficiencies of operations, and competitive breakthroughs.

The administrative burdens of this task are awesome. We would expect it to be years before we could be sure of tax liabilities which might be assessed retroactively in very large amounts. These assessments could be confiscatory in their application.

Despite Lone Star's relatively small size and young age, it is a tough and successful competitor against the giant steel companies in the world. However, this usage tax is the most important issue that we have faced in our history of more than 30 years. We urge this Committee to give serious consideration to our plight, which is far from unique in American industry.

Lone Star Steel originated as a war production plant. A brief history of the Company is attached to my statement. The thing to note is that it was built in a place and at a time where natural gas was plentiful and inexpensive. The plant was enlarged and modernized based on the use of natural gas, and practically none of our existing processes can be converted to other fuels. Construction of what amounts to virtually a new plant embodying new processes and new equipment will be necessary to convert from the use of oil and gas to other fuels.

We have not, however, been blind to reality and the future. Lone Star has been acutely aware for some time of problems concerning the future availability and cost of natural gas and oil. We planned accordingly, formulating a rebuilding program that started in 1973, approximately four years ago, and that will be completed by 1983. This program involves an orderly progression of construction enabling us to switch from natural gas to other fuels, primarily electricity to be generated through the use of coal. To a large extent, this program involves construction of entirely new facilities. $180 million has already been spent, or is contractually committed, and much more will be necessary to complete the job over the next decade. We intend to reduce our consumption of natural gas by 65%, but it will take us eight years to do so. This means we cannot accomplish our objective until 1983. In later years we expect to achieve a further reduction in our oil and gas usage. The massive projects I have mentioned were undertaken because of the price and availability of fuel, and not because of the threats of imposition of a Federal tax. There is attached as Appendix A a detailed statement of our conservation efforts.

We feel very strongly that we have been progressive in foreseeing natural gas problems, and that we are doing our part as speedily as possible to reduce our use of natural gas. Consequently, we are utterly dismayed at the proposal to tax away millions of dollars needed for our construction program developed for the very purpose of adapting our facilities to other fuels.

We have a number of concrete suggestions to offer to improve S. 1472 and to make it workable rather than merely punitive.

(1) The industrial use tax should be eliminated. It is simply not needed to encourage industry to conserve. It is in our own self-interest to conserve as much as possible, since the prices have risen dramatically and availability in the future is most uncertain.

(2) If a use tax is enacted at all, it should apply only to the use of natural gas or fuel oil to fire stationary boilers. This is a use that clearly can be converted to other fuels and is obviously the primary use at which the Administration is

aiming. This approach would achieve substantially the same result as the exemption from tax of process uses where no substitute fuel is possible or economic. It would also eliminate the uncertainty that must exist until the Internal Revenue Service rules on many thousands of process uses, a time consuming and uncertain procedure that will be unnecessarily costly for industry, consumers and the Government. Another serious problem is that exempt process uses might not be administratively defined exactly as the Congress intended.

(3) If a use tax is enacted, the effective date should be 1983 for industry just as it is for utilities, rather than 1979 as proposed. It is utterly impossible for everyone to convert to coal within a 16-month period. To attempt to force them to do so, and to punish them if they do not, will cause severe disruptions that are totally unnecessary. Moreover, a large tax enacted in 1977 to be effective in 1983 will provide a very strong incentive for conversion by that date, but will permit orderly conversion. This should accomplish the Administration objective.

(4) If a use tax is enacted, the definition of expenditures for which credits or rebates could be received should be expanded to cover the costs of new facilities acquired or constructed for the purpose of converting from natural gas or fuel oil, and should also cover the acquisition of manufacturing equipment which results in a reduction of 10%, for example of the units of energy consumed with respect to the manufacturing process which is replaced or modified. In spite of the fact that we will be spending many hundreds of millions of dollars to convert our facilities to alternate fuels, the credits provided in S. 1472 or H.R. 8444 do not seem to be available to us.

In summary, a tax on the industrial use of natural gas and oil is not necessary to conserve energy, and in any event should not be imposed until a reasonable time for conversion has been allowed. The existing high prices and uncertainty with respect to future availability will force industry to convert and conserve. If a tax is enacted, for the sake of simplicity and ease of administration it should apply only to boiler fuel.

HISTORY OF LONE STAR STEEL

The original Lone Star Mill, consisting of ore beneficiation facilities, blast furnace, coke ovens and a power generating plant was constructed by the Defense Plant Corporation during World War II as a source of war-short pig iron. However, the war ended prior to it being fully completed. Lone Star Steel operated the facilities first as lessee and then as owner. Following the purchase of the plant from the War Assets Administration, Lone Star produced the first pig iron in October 1947.

The location of Lone Star, in Northeast Texas, was determined by DPC, and was chosen because of it being in the middle of the Northeast Texas brown ore deposits with fuel readily available from the East Texas oil field, and with a relatively short railroad haul for Oklahoma coal (250 miles) and Texas limestone (175 miles), the other two basic raw materials needed for iron production.

In 1950, a cast iron pressure pipe foundry was completed followed by Lone Star's $90 million expansion into steel production in 1953. At this time Lone Star Steel became a completely integrated steel producer—from ore to finished product—and began its way up to becoming one of this country's largest pipe producers and a prime supplier of tubular goods to the oil and gas industry.

Subsequent additions to the facilities enabled Lone Star to produce standard pipe, both black and galvanized, for the construction industry, spiral weld pipe for large diameter water transmission lines, and mechanical tubing for use in automotive and agricultural equipment industries.

ENERGY MANAGEMENT AND CONSERVATION BY LONE STAR STEEL CO.

Lone Star Steel Company, a primary metals industry dating back to the early 1940's, is a vertically integrated steel company with 5,000 employees located approximately 150 miles east of Dallas, Texas.

Utilizing its own 75 year reserves of low-grade iron ore plus coke, limestone and steel scrap, Lone Star Steel Company has a raw steel production capacity of 1.7 million tons per year, which is about 1 percent of the total domestic steel production capacity for the U.S. Lone Star Steel Company's raw steel production (ingots, blooms and billets) is converted into 700–800M tons of pipe, 60 percent to 70 percent of which is dedicated to the production and transportation of oil and natural gas Other tubular and non-tubular products serve the building and construction industries and automotive and implement manufacturers.

Steel companies such as Lone Star Steel Company with ore processing plants, coke ovens, blast furnaces, open hearth furnaces, rolling mills and heat treating furnaces and facilities have, by technological necessity, been mammouth consumers of energy derived from oil and natural gas in addition to the metallurgical requirements of coal/coke energy.

Prompted and compelled by the force upon which the free-enterprise system exist—profits for stockholder dividends and funds for reinvestment growth—Lone Star Steel Company, has recognized for more than a decade the necessity for the management and efficient use of energy. To this end, heat from open hearth and ore calcining stacks, formerly wasted to the atmosphere, was harnessed in 1972 at cost of $3.7 million to drive pollution control equipment of these facilities. This pollution control equipment, developed and patented by Lone Star Steel Company, represents the highest level of technology in the world for the wet scrubbing of fine particulates. In 1967, departing from its traditional use of natural gas as a source of fuel for heat treating furnaces, Lone Star Steel Company pioneered the use of electrical induction heating of large diameter pipe for a small segment of its business, a move which otherwise would have increased its consumption of natural gas by 8 to 10 percent.

Although Lone Star Steel Company had committed itself to the management and efficient use of energy prior to the national recognition of an energy crisis, the oil embargo of 1973 by the middle east nations alerted Lone Star Steel Company that management and the efficient use of oil and natural gas could only be a temporary solution for the industrial use of such energy. It became apparent to Lone Star Steel Company, because of price/availability and/or the possibility of governmental intervention, that the permanent solution required a significant reduction in its dependency upon natural gas and oil as a source of energy.

The enormity of the task and the investments for new processes which would be required to achieve less dependency upon natural gas and oil as a source of fuel dictated that Lone Star Steel Company begin in 1974 a program which would be completed in 1983. The program, spanning nine years, will require investments of more than $450 million, of which $180 million has already been spent or committed.

The first major step of Lone Star Steel Company's nine year energy plan which began in 1974 was completed in 1976. An electrical power contract was negotiated with Southwestern Electric Power Company which would assure adequate electrical energy to Lone Star Steel Company. The source of this electrical power was a new, 528 megawatt power plant fired by Wyoming coal. The plant, constructed by Southwestern Electric Power Company was built at a cost of approximately $130 million.

Having obtained an assured source of electric energy, Lone Star Steel Company constructed an electric arc furnace facility which had a steel production capacity of about 30 percent of its natural gas/oil dependent open hearth furance. In order to bypass the energy dependent rolling mill process, a continuous casting facility for billets and blooms from electric furnace steel was added which also served as a test program for a large continuous slab caster. Extrusion mills which utilized electrical induction heating for billets and blooms as a process step in the manufacture of extruded pipe completed the $55 million program.

The electric furnace/continuous casting/extrusion mill facility was constructed completely independent of natural gas or oil as a source of fuel and had the effect of substituting coal generated electric power for 5.9 trillion BTU's of natural gas and oil energy per year which would otherwise have been needed.

As a move to reduce its use of fuel oil, Lone Star Steel Company purchased a semi-anthracite coal mine in 1975. Prior to this move, fuel oil had been injected into the blast furance as a subitute for coke because coke was unavailable. The semi-anthracite coal was substituted for the substitute (fuel oil) and fuel oil consumption was reduced by 1.2 trillion BTU's per year.

In April 19, 1977, Lone Star Steel Company began two projects totalling about $100 million which will further reduce its use of natural gas and oil.

The first project, which is scheduled for completion in 1978, is an ore sintering facility to replace existing ore calcining kilns. When completed, the sintering facility will reduce Lone Star Steel Company's total consumption of natural gas by 5 percent.

The second of the projects, scheduled for completion in mid 1979, is a 500M ton per year coke plant facility for which Lone Star Steel Company acquired metallurgical coal reserves to sustain the operation on a long term basis. The by-product type coke oven being installed by Lone Star Steel Company not only produces coke for its blast furnace operation, but is a producer of fuels in the

form of gas, oils and tars for its other operations. By assuring Lone Star Steel Company of an adequate supply of coke for its blast furnace operation, the coke plant project will eliminate the need for natural gas and/or oil injection into the blast furnace as a fuel. The coke plant facility will generate the BTU equivalent of 23 percent of Lone Star Steel Company's natural gas and oil requirements.

Having proven continuous casting with the smaller Billet/Bloom caster, a continuous slab casting facility for its open hearth furnaces is in its preliminary engineering phase and will further reduce Lone Star Steel Company's dependency upon natural gas. Ingots, produced by open hearth furnaces, require soaking furnaces to bring them to a uniform temperature prior to rolling into slabs. With the use of a continuous slab caster the soaking furnace process is eliminated. This $80 million project will conserve 8 percent of the total natural gas which is now required in Lone Star Steel Company's operation. Completion of this facility is projected to 1980–81.

Natural gas fired furnaces for reheating steel slabs and for normalizing (heat treating) pipe presently require about 38% of Lone Star Steel Company's total natural gas consumption. By 1983 Lone Star Steel Company plans to have completed an $80 million conversion of these facilities to electrical heating.

To complete the multi-million dollar energy conversion program undertaken by Lone Star Steel Company in 1974 will require the replacement of its open hearth furnaces. Presently the open hearth furnaces are fired with both natural gas and fuel oil. Prior to their replacement with either large electric furnaces or basic oxygen furnaces, Lone Star Steel Company will phase out the open hearth operation's use of natural gas substituting the more costly fuel oil as the total fuel by 1983. Subsequent to the open hearth total fuel oil operation, the open hearth furnaces will be replaced at an expenditure of approximately $150 million. Completion of this last step of Lone Star Steel Company's energy-related program will conserve 20% of its present consumption of natural gas and substitute alternate fuels for 5 trillion BTU's of oil and natural gas per year.

Through the efficient use, management and conservation of energy sources, Lone Star Steel Company has and will continue to reduce its dependency upon and consumption of natural gas. The following table illustrates the progress and planned progress of Lone Star Steel Company's energy program.

ENERGY MANAGEMENT AND CONSERVATION BY LONE STAR STEEL CO. (SUMMARY)

	Consumption of natural gas and oil			
	Btu (billions)	Percentage of 1974 consumption	Capital expenditures (millions)	Electrical power costs (millions)
Year:				
1974	22,797	100	[1] $13.2	$1.0
1975	22,448	98	[1] 21.0	1.5
1976	20,953	92	[1] 20.8	3.0
1977	20,953	92	[2] 20.5	8.5
1978	20,287	89	[2] 57.7	10.0
			[3] 11.0	
1979	18,097	79	[2] 21.8	10.4
			[3] 43.5	
1980	17,181	75	[3] 25.5	
				12.0
1931	15,581	68	[4] 26.8	18.2
1982	11,781	52	[4] 53.2	40.6
1983	7,981	35	[4] 37.5	43.0
Later	2,981	13	[4] 112.5	80.5
Total			[5] 465.0	

[1] Completed.
[2] In progress.
[3] Engineering underway.
[4] Planned.
[5] These expenditures only maintain Lona Star Steel Co.'s presently existing production capacity of 1,700,000 tons.

For Lone Star Steel Company to achieve its plan and to continue its progress in energy management, the President's energy plan should be amended to include a reasonable time to convert from natural gas or petroleum, an exemption for certain "process" uses of fuel, and an expanded definition of the investments qualifying for the industrial rebate.

STATEMENT OF PAUL W. EGGERS, PRESIDENT, GEOTHERMAL KINETICS, INC.

Mr. Chairman and members of the committee, I am Paul W. Eggers, President of Geothermal Kinetics, Inc., a small independent company engaged exclusively in the development of geothermal energy. As a former General Counsel of the Treasury Department, I am pleased to appear once again before this distinguished Committee. I am appearing in support of S. 1961, legislation which would make available for the development of geothermal energy resources exactly the same tax incentives already available for all other extractive industries. Equality of treatment is essential to development of this attractive and potentially significant environmentally acceptable, domestic energy resource. The Senate has twice passed legislation to provide tax incentives for geothermal development, most recently as part of the Tax Reform Act of 1976.

Enactment of this legislation is badly needed by small independent companies. A great deal of important work is being done by these companies like Geothermal Kinetics, Inc. which is engaged exclusively in the development of geothermal energy. Although only six years old, it has brought together a team of experts who have been pioneers in the field of geothermal exploration. We are hampered, however, by our inability to attract adequate capital to exploit known geothermal resources.

We are unable to attract sufficient capital because (1) commercial bankers are unwilling to take risks on an infant industry which they know little about and which has no track record; (2) there is a time lag of about five years between the drilling of a well and the realization of income; and (3) private investors are reluctant to invest for these reasons and because of the current uncertain tax treatment. In our judgment, a business deduction and intangible drilling costs such as would have been provided by the Fannin bill, S. 2608, would provide sufficient incentives to solve the problem of attracting capital in adequate amounts to create a viable geothermal industry.

In addition to the deduction of intangible drilling costs as recommended in the President's National Energy Plan, a deduction against income derived from geothermal production is necessary. The tax deduction for intangible drilling costs proposed by the President will not alone be enough to attract the necessary investment to assure strong geothermal development. The additional deduction against income is also essential.

The President's energy program has been criticized to some extent on the grounds that it does not place sufficient emphasis on production. Providing incentives for exploration and development of geothermal energy resources will be a positive approach to solution of the energy problems.

The geothermal industry is at a stage similar to that of the oil and gas industry thirty to forty years ago. The industry needs the same types of incentives as those which proved to be successful in spurring the development of oil and gas resources. We are asking only that geothermal, an infant industry, be granted the same incentives and opportunity for growth that were initially provided for oil and gas.

The potential of geothermal energy in this country cannot and will not be developed unless incentives are provided to enable this infant industry to become viable. Exploration and drilling are very expensive operations and require considerable amounts of risk capital. As you know, risk capital will be made available only if there are reasonable prospects of a substantial return on the investment. In the absence of tax incentives of the type already available to coal, with which geothermal competes, the prospects of significant production at competitive prices are remote.

Moreover, it should be remembered that geothermal resources are available not only in the form of super heated steam but also in the form of hot water with lower temperatures. A temperature of 350° is hot enough to be used for the production of electricity, but as the temperature decreases, the costs rise. Enactment of similar incentives to those provided for coal will make it possible to produce electricity from marginal and intermediate geothermal areas which otherwise will remain undeveloped for decades. Only areas like the Geysers where super heated steam is available close to the surface, will be developed in the absence of tax incentives.

It is now generally recognized that geothermal offers a significant environmentally-sound source of energy in the Western part of the nation and probably the Southwest as well. Geological and geophysical work conducted in the Eastern part of the United States indicates that there is a substantial potential for development of geothermal resources in that section of the country also.

During the past five years improvements in technical and scientific techniques of locating and exploiting geothermal prospects, have made the commercial development of geothermal resources an immediate possibility. I should like to emphasize that additional research and experimentation will not be necessary for geothermal development as it will for some of the more exotic energy proposals. The technology is known and available. All that is needed to make geothermal energy an immediate, readily available, partial answer to our increasing energy crisis is clarification of the tax laws to accord with the decision of the Court of Appeals for the 9th Circuit in *Reich et al* v. *Commissioner of Internal Revenue*, 454 F2d 1157 (9 Cir. 1972), affirming 52 T.C. 700 (1969). In that case the Court held that geothermal steam is a depletable resource and entitled to intangible drilling costs and depletion. Unfortunately, the Commissioners of Internal Revenue has not accepted the holding of that Court.

S. 1961 would clarify the law and, by providing the same types of tax benefits as are now available for fossil fuels, will insure the development of significant amounts of geothermal energy in the near future.

Thank you.

STATEMENT OF JOSEPH W. AIDLIN, VICE PRESIDENT AND GENERAL COUNSEL OF MAGMA POWER CO.

Honorable Chairman and members, Magma Power Company, of which I am an officer and General Counsel, supports legislation similar to that twice previously passed by the Senate, that would provide a business deduction for the extraction of geothermal energy and the expensing of intangible drilling costs with respect thereto. This legislation was introduced as S. 1961 by Senator Gravel on July 29, 1977.

Our experience as pioneers in exploring for, developing and furthering the utilization of geothermal resources leaves no doubt that legislation such as this is essential if development and utilization of this promising resource is to be accelerated. Our belief, based upon our experience, is that the extensive geothermal resources which exist in our country could make a major contribution in meeting our energy needs. We are also convinced that such will not be the case unless the tax incentives referred to are granted at this time.

Federal loan guarantee and grant programs are helpful, but they are not a substitute for, nor in effectiveness are they the equal of, the utilization of private capital in geothermal development and use. The characteristics of the resource, however, are such that the necessary capital buildup and the necessary inducement for capital expenditure are not now sufficient, nor will they be sufficient for some time, without additional tax incentives.

Magma Power Company operates only in the field of geothermal resources. We have no present interests in any other energy sources. We have devoted all of our available resources to exploring for and developing the resource and in exploring the means of utilizing these resources, especially in the generation of electric power. For example, we are at the present time utilizing all of our cash available from our operations at the Geysers field in California (where we operate in a joint venture with Union Oil Company of California and Thermal Power Company, owned by Natomas) to the construction of a binary cycle, electric generating plant in the East Mesa area of Imperial County, California in order to demonstrate the technology and economics of the generation of electric power using medium-range temperature waters. We concede that this program is not entirely orthodox and it is daring, but we concluded that it had to be done if we were going to avoid additional years of delays in the utilization of the geothermal resources already known.

Despite our activity as a private free enterprise organization and despite the fact that the decision of the 9th Circuit Court of Appeals granted intangible deductions and depletion to us at the Geysers, the Internal Revenue Service continues to harass us and to question this right, which is obviously the law of the Circuit. It is imperative that the Congress resolve this and other questions once and for all and point all activities of government in the single direction which Administration policy has already indicated in some of its proposals in relation to energy.

It will undoubtedly be of interest for you to know that the development of geothermal energy will make available lower cost energy and be of far greater benefit to the people in the long run than the questionable loss in tax revenues which

might result from providing geothermal the same tax incentives provided coal and other extractive industries. Pacific Gas and Electric Company has reported that in 1976 its system price per net kilowatt hour in plants using fuel oil over 24 mills per kilowatt hour for fuel oil. The cost was over 17 mills per kilowatt hour for natural gas, and the cost was 11.35 mills per kilowatt hour for geothermal energy. In 1977 the price being paid for geothermal steam at the Geysers is at the rate of 14.18 mills per kilowatt hour. The fuel oil and natural gas prices will, of course, be higher than the 1976 prices. The fuel cost savings at the Geysers are obvious and so is the public interest.

We do not hesitate in stating that enactment into law of S. 1961 will accelerate development and use of a resource which exists in massive quantities and which should be rapidly developed in the public interest.

Thank you.

STATEMENT OF DR. CAREL OTTE, UNION OIL CO. OF CALIFORNIA

Mr. Chairman and members of the committee, my name is Carel Otte. I have been actively engaged in geothermal work since 1962 and have personnally participated in both research and operating activities in most of the major geothermal areas of the country. I have also been active in scientific and geothermal industry association affairs. I am President of the Geothermal Division of Union Oil Company of California and I am Chairman of the Advisory Committee on Geothermal Energy of the U.S. Energy Research and Development Administration.

I am appearing in support of S. 1961. This bill is similar to the Fannin bill, S. 2608, of last year, which would have provided for geothermal development the same type of tax treatment as that provided other wasting assets. Steam and hot water from the earth's crust is readily available in many places, primarily in the Western United States, while the geopressured areas of Louisiana and Texas hold promise for the long-range future. Geothermal energy has the potential of providing environmentally acceptable, domestic energy in important amounts. The geothermal industry is very pleased that the President has proposed in the National Energy Plan to confirm to geothermal drilling a tax deduction for intangible drilling costs.

While we heartily endorse this proposal and urge its adoption we believe that there should also be allowed the deduction from gross income derived from geothermal properties that is provided in S. 1961. This would recognize the clear scientific evidence that geothermal energy is an exhaustible or wasting natural resource (Appendix B) and would put it on an equivalent basis with other wasting assets such as, for example, strip-mined coal with which it is in competition for central station power generation.

If geothermal energy is to make the substantial contribution to domestic U.S. energy which it is capable of making within the last quarter of this century, it is imperative that encouraging tax legislation be enacted and that appropriate tax incentives be provided. Without such incentives, the tremendous amounts of capital required for geothermal energy production will simply not be available. At the present time geothermal development is being held back by lack of investment and by high costs which make it non-competitive with other energy sources.

The outlook for geothermal energy production has been studied extensively by various Governmental and non-Governmental groups and the consensus emerging from these studies is that there is the geological opportunity to delineate geothermal resources to support 20,000 megawatts of electrical generating capacity by 1985. Such capacity—equal to 5 percent of current national electrical capacity—represents the equivalent of 250 million barrels per year of low sulphur crude oil. However, resource development to support this capacity is estimated to require investment ranging in excess of $10 billion.

There are great economic barriers which this industry must overcome: the tremendously high costs of drilling for geothermal deposits in hard rocks, with high temperatures and corrosive fluids; the very large capital investments required over several years before revenues can begin for a geothermal project; the requirement for drilling many replacement wells at each development site to maintain a constant stream of energy; and the present discouraging Federal income tax controversy.

It is inconceivable that, given our present energy crisis, this nation should not make every reasonable effort to develop available domestic energy resources, par-

ticularly when the costs of doing so are so small. Enacting the legislation we are supporting would result in a loss of Federal revenue estimated at less than $20 million for the first year in which it is fully effective. This amount would rise significantly over the years only if there is substantial increased development of geothermal resources, which would, of course, be the objective of the legislation; and—which would result in taxes collected far in excess of the cost of the tax incentive provided. And these are taxes which will not be collected if the desired development does not occur.

We are satisfied that if legislation similar to that of section 2004 of the Tax Reform Act of 1976, as it was passed last year by the Senate, the so-called Fannin bill, is enacted into law, there will be provided sufficient incentive to attract the necessary capital investment to create a new industry providing significant amounts of sorely needed energy in future years. Without incentives of this type the future development of geothermal energy remains clouded.

I have attached a statement giving a brief background on geothermal energy development (Appendix A). It is urged that the legislation now incorporated in S. 1961 be approved for the third time by the Senate, and this time be enacted into law.

APPENDIX A

Attachment to Statement of Dr. Carel Otte

BRIEF HISTORY OF GEOTHERMAL ENERGY DEVELOPMENT

The only major U.S. geothermal energy development is The Geysers field located about 90 miles north of San Francisco in California's Sonoma County. The development began in 1960 with a 12.5 megawatt generating plant. In 1973, it became the largest geothermal development in the world, with a capacity of 400 megawatts. The installed generating capacity now exceeds 500 megawatts, sufficient to supply electrical requirements of a city of 500,000; an additional 400 megawatts is now under construction. The Geysers eventually is expected to achieve a capacity of more than 2,000 megawatts, but it will have required more than 25 years to achieve it.

Other areas which have promise for early development in the near future—given the needed incentives—are in North central New Mexico and the Imperial Valley of California, and active exploration is also being carried on in other parts of California and New Mexico and in Nevada, Oregon, Idaho, Utah and Arizona. The geopressured areas of Louisiana and Texas hold promise for the longer range future.

PRACTICAL UTILIZATION AND POTENTIAL ROLE IN NATIONAL ENERGY PICTURE

Geothermal energy undoubtedly has the potential for a fairly wide range of use in coming decades, and even today in some nations it is utilized for space heating and industrial process heat, such as in the New Zealand paper industry. However, the immediate and near-term practical use in the United States is and will almost certainly continue to be primarily for electrical power generation. A pound of steam from the earth is indistinguishable from a pound of steam from a fossil-fuel-charged boiler and has been proven to be as effective in powering conventional electrical generating equipment.

But there are tremendous economic barriers which this industry must overcome: the tremendously high costs of drilling for geothermal deposits in hard rocks, with high temperatures and corrosive fluids; the very large capital investments required over several years before revenues can begin for a geothermal project; the requirement for drilling many replacement wells at each development site to maintain a constant stream of energy; and the present discouraging Federal income tax treatment.

The projected investment for developing resources to support 20,000 megawatts of generating capacity includes the costs of drilling at least 1,200 exploratory wells and 8,000 development wells at a minimum cost of $750,000 per well, or a total of $6.9 billion in 1977 dollars in drilling costs alone. Depreciable investment in hook-up facilities will add another $3 billion, bringing the total investment requirement to about $10 billion. Moreover, a like investment will be required for replacement production wells and facilities through the approximately 30-year operating life of each development as the resource depletes.

TAX CONSIDERATIONS

It is extremely unlikely that the goal of 20,000 megawatts of geothermally-generated electric power will be achieved unless encouraging tax legislation is enacted and tax incentives thereby clearly established.

At the present time the Federal income tax treatment of geothermal well costs and production is in doubt. The Circuit Court of Appeals in the *Reich* and companion cases (*Reich et al.* v. *Commissioner*, 454 F.2d 1157 (9 Cir. 1972), affirming 52 T.C. 700 (1969)) held that geothermal energy in The Geysers field is an exhaustible natural resource and is entitled to depletion under existing law. In spite of this decision and the clear scientific evidence that geothermal energy is an exhaustible natural resource, the national office of the Internal Revenue Service is disallowing intangible drilling cost treatment and percentage depletion in respect of all geothermal activity and has announced its intention to press its position in the courts.

As a fledgling industry, geothermal energy must compete with the lowest cost alternative energy available to electric power utilities. In the West, where geothermal resources are most prevalent, the alternative is low-cost, strip-mined coal. Loss of percentage depletion and the right to deduct intangible drilling and development costs for geothermal energy would mean that the major portion of the geothermal resources would be non-competitive with coal and other alternative sources of energy which have the benefit of more favorable tax treatment. As a result, the nation's geothermal resources would remain largely undeveloped.

APPENDIX B

Depletion of Geothermal Resources

It has been scientifically established that geothermal resources do deplete, and this conclusion has been accepted not only by scientific writers but by the courts on the basis of evidence presented. In the case of *Reich et al.* v. *Commissioner of Internal Revenue*, 454 F2d 1157 (9 Cir. 1972), affirming 52 T.C. 700 (1969), the first question considered by the United States Court of Appeals for the 9th Circuit was stated by the Court as follows: "(1) Are the taxpayers' reserves of geothermal steam an exhaustible natural resource?"

The Court affirmed the decision of the Tax Court that geothermal steam in the Geysers area was depletable. A copy of the decision is attached. In pertinent part the Court stated:

"The principal factual dispute between the parties before the Tax Court concerned the nature and exhaustibility of the steam reserves at The Geysers. After reviewing extensive documentary evidence and hearing expert testimony from geologists and engineers, the Tax Court made these findings of fact:

"Geothermal steam is a gas. The geothermal steam at The Geysers is contained within a closed reservoir in a finite amount with no significant liquid influx to or boiling within its confines. The geothermal steam at The Geysers is an exhaustible natural resource which has depleted and is continuing to deplete.

"Our review of the record convinces us that ample evidence supports this factual conclusion."

The reasons why geothermal energy is depletable may be summarized briefly.

Depletion in Geothermal Reservoirs.—Geothermal energy, unlike solar energy, is a finite resource. It takes geological time periods of seevral hundred thousand years for a geothermal field to mature or for the magma to heat the surrounding rock and fluids by conduction, but it takes only 50–100 years to extract its useful energy. In another 100,000 years or so, a depleted geothermal field may be ready again for exploitation. None of the major geothermal fields known so far have been abandoned but these reservoirs do show partial depletion and depending upon their age this is significant.

Heat Depletion.—Rock is a poor conductor; it is a good insulator. In a mature geothermal field, like the Geysers, the heat being transferred from the magma is roughly the same as the heat being lost at the surface due to conduction, and is about 64 million BTU per hour.

In the Geysers, the current production is about 9 million pounds per hour of steam. This corresponds to a heat extraction rate of 11,000 million BTU per hour. Thus, the heat extraction is about 170 times the heat recharge. In other words, the heat extracted in one year is equivalent to the heat released by the

magma in 170 years! This number is expected to increase as the installed capacity at the Geysers increases to four times the present amount.

Mass Depletion.—In the foregoing, we limited our discussion to the depletion of heat energy. Water is the medium through which heat is extracted and all indications are that water also depletes. The rate of water depletion will depend on the location of a geothermal reservoir in relation to the surface topography and the subsurface hydrology. The cold outside water may move into the hot water aquifer as soon as hot water is withdrawn, or it may not move at all. If the same amount comes in as goes out, pressure in the reservoir would not decline, but that is not in line with the experience.

Major geothermal reservoirs have shown a decline in pressure with time, indicating water depletion. Ramey[1] studied the shallow zone of the Geysers and plotted pressures against cumulative production clearly showing a decline in pressure. Ramey and Whiting[2] carried out a similar study on the Wairakei, New Zealand field (Figure 3) indicating depletion. Celati, et al.[3] discuss pressure decline in Larderello, Italy.

Since it is established that geothermal resources are exhaustible, it is the job of the scientists to insure that a particular geothermal resource will last as long as the project life of the particular generating facility using the energy product. This is of critical importance.

Since steam cannot be transported the generating plant must be built at the geothermal site, and it is totally dependent upon the energy produced at that site. Therefore, the economics of the situation requires that the geothermal field be capable of producing enough energy to supply 100% of the needs of the generating facility throughout its life. For example, if the life of the facility is projected at 35 years, the scientists must insure that the geothermal field will produce sufficient energy to supply the facility for 35 years, i.e., the field must not be exhausted before the 35 years have expired. This determines the rate of extraction of the geothermal energy.

The experience at the Geysers field with respect ot the drilling of wells to replace depleted wells may be enlightening.

Year and wells drilled to replace depleted wells:	*Installed generating capacity (kilowatts)*
1972 (1)	192,000
1973 (1)	302,000
1974 (2)	412,000
1975 (7)	467,000
1976 (6)	502,000
1977 (to date) (6)	502,000

It will be noted that replacement wells were needed in earlier years, but that as production continues more wells are needed.

STATEMENT FILED BY UNION OIL CO. OF CALIFORNIA

Union Oil Company appreciates this opportunity to discuss a very serious flaw in the National Energy Plan. We believe this flaw to be so serious that it threatens both the future success of the plan and the competitive structure of the industry. We also believe this Committee has the ability to correct his flaw.

The flaw is the plan's misconception that, by simply offering higher prices only for future oil and gas production, while continuing tight price controls on existing production, the nation's oil companies will have adequate incentives and the financial resources to carry out the needed domestic exploration and production programs.

We do not dispute the level of the proposed future prices as an adequate incentive. However, we do dispute the statement that the oil companies, as a group, are "awash with cash" and have all the financial resources they need to

[1] Henry J. Ramey, Jr.: "A Reservoir Engineering Study of The Geysers Geothermal Field, March 1, 1968," submitted as evidence, *Reich et al.* v. *Commissioner of Internal Revenue*, 1969. Tax Court of the United States, 52 T.C. No. 74, 1970.

[2] R. L. Whiting and H. J. Ramsey: "Application of Material Energy Balances to Geothermal Steam Production," *Journal of Petroleum Technology*, Vol. 21, July 1969, p. 893.

[3] R. Celati, P. Squarci, L. Taffi, and G. C. Stefani: "Analysis of Water Levels and Reservoir Pressure Measurements in Geothermal Wells," *Proceedings, United Nations Symposium on the Development and Use of Geothermal Resources*, San Francisco, May 20-29, 1975, Vol. 3, p. 1593.

push ahead. While a few of the companies—especially the five international giants—may indeed have surplus cash flows and the capacity to support large additional amounts of debt, most of the nation's domestic oil companies are not in such a fortunate position. The attached Exhibit I, which lists selected financial data for the 15 largest oil companies, shows the differing financial situation of these companies.

These three key conclusions can be drawn from this data:

1. The assets and cash flow of the top five or six companies put them in a distinctly stronger position to finance aggressive future U.S. exploratory programs than do those of the middle sized to smaller domestic companies. Certainly compared to the costs of replacing our depleting reserves, we know that Union Oil's cash flow is inadequate. We suspect the same is true for most of the other largely domestic companies.

2. Because the larger companies have, on average, lower debt ratios and better bond ratings than the smaller companies, they can borrow larger sums to finance future programs at lower costs than smaller companies. The debt ratios of many of the companies on this list—especially those in the lower half—may already be too high by the standards of much of the financial community.

3. Because of the availability of product imports from large, efficient refineries outside the United States, it is likely the U.S. refiners will be unable to raise product prices sufficiently to recover the full amount of the proposed crude oil equalization tax. The potential adverse impact on a U.S. refiner that must absorb part of this tax—the Administration assumes that competitive pressures will force refiners to absorb one-third of it—is more serious to the smaller domestic companies than it is to the larger ones. Absorbing one-third of COET would cause Union Oil's overall profits, for example, to fall by about 25 percent, compared to a fall of only 7 percent for Exxon. This happens because domestic refining is generally relatively more important to the smaller domestic companies.

The problem brought out by the data in Exhibit I arises because the level of federal controls imposed on lower tier oil and on gas production keep prices too low. Due to these controls, domestic producers are forced to liquidate their principal asset—their U.S. oil and gas reserves—at less than today's replacement costs. Unfortunately, the smaller the company, on average, the potentially more serious is this problem. As any merchant knows, selling at less than replacement cost is a sure fire way to go out of business.

This Committee's distinguished Chairman, Senator Long, correctly identified this problem on August 9 when he made this comment to Secretary Blumenthal:

"If you want (a producer) to continue to produce as many barrels (as) he is selling now, it seems to me he ought to be able to get the same price, at a minimum, that it is going to cost him to produce the additional barrel of oil.

"Otherwise your program is going to encourage him to go out of business or produce only one-third of what he could produce if he were permitted to sell his oil on the cost of replacement rather than (what) it cost him many years ago to go out and find that oil." (p. 45, *Transcript*)

While today's capital investment requirements to find and develop new sources of U.S. oil and gas are difficult to estimate precisely, we believe it is possible to make a reasonably accurate estimate for the U.S. domestic industry. Exhibit II shows our estimates, as well as our estimates of the cash flow generated from current sales of oil and gas. Union Oil's own internal data, which we must treat as confidential, are generally in agreement with the industry estimates shown in Exhibit II.

The data in this exhibit show that, for at least the past three years, domestic oil and gas producers, reflecting tight federal price controls, are liquidating their existing oil and gas resource base at $1.00–$1.50 a barrel *below* its replacement cost. It should thus be obvious why domestic reserves are falling and most oil company debt ratios are rising.

Incidentally, some may mistakenly conclude from the data in Exhibit II that, with capital investment costs averaging $3.50 a barrel, the future producer of "new, new" oil, which will sell for $13–$14 a barrel, will be making fat profits. This is not true, as the data in Exhibit III shows. Because of the long time delays that typically exist between the initial capital investments in new exploratory prospects, followed by lengthy development programs for the few that are successful, the after-tax rate of return on such a capital investment is seen to be only about 11%. This rate is below the average of all U.S. manufacturing companies. (The details behind the curves in Exhibit III will be provided if desired.)

At this point a critic might say: "All right, you've made your point about the past. We're sorry, but that's politics. Let's look to the future. No longer will you have to sell your oil at $5 a barrel and your gas at 50 cents a thousand cubic feet. The future's going to be rosy. Go ahead with your exploration. Borrow if necessary, but go ahead."

To this we must reply:

1. The prospective higher returns from "new, new" oil and gas are many years and many risks away. With debt ratios already high (at least for many of us), where will the cash flow come from to bid for the new leases and to finance the increasingly costly and risky search?

2. Under the present Energy Policy and Conservation Act, the "composite" price for all U.S. crude oil is, apart from inflation adjustments, a fixed number. If one element goes up (as "new, new" oil is supposed to), other elements must go down. Faced with this modern equivalent of Catch-22, where we must ask, is the overall industry incentive?

3. We've been misled by a number of past federal policies that suggested that, if we quietly make our investments and be patient, in time everything will be fine. But what has really happened? The rainbow and its pot of gold keep vanishing. The Cost of Living Council ended up by decontrolling all prices *but* oil; President Ford offered us the world price for "new" oil, but that soon became today's tightly controlled upper-tier oil; Presidential-candidate Carter proposed to free the prices of new natural gas, but real President Carter decided to keep controls and even to extend them to intrastate gas; President Ford and the Congress promised to end all oil price controls in 1979, but President Carter now wants to extend them forever. The FEA and this Administration got Congress to agree to a pricing schedule in Energy Action 11. But now the Administration has again changed its mind—and for the worse. We thus ask: With a record like that, does it really seem prudent to go deeply in debt today with the expectation that in a decade or so the prices of "new, new" oil and gas will make it all OK?

Our answer is "No" and our forecast is that the needed new discoveries of domestic oil and gas will fall short of the projections in the National Energy Plan. Also, we worry about how long some of the companies that are listed in Exhibit I can afford to continue as aggressive competitors in the search of new sources of oil and gas.

We see two main alternatives available to correct the problem that we have outlined:

1. The proposed crude oil equalization tax could be modified to allow for an increasing portion of it (starting, say, at 20%) to be returned to the producer in return for accelerated exploration or for investments in new energy sources such as oil shale.

2. A part of the crude oil equalization tax could be, in essence, gradually phased out by coupling it with increases in the ceiling prices of old oil. These increases should reflect both inflation and the higher level of its true replacement cost. We estimate that a special increase of $2.00 to $3.00 a barrel for old oil is currently the minimum amount needed to accomplish this. (Please realize that 50% of any increase is returned as federal income taxes.)

In either case, of course, the present Catch-22 problem caused by the inflexibility of the composite price must be corrected. The proper correction is simply to eliminate it from the statute. Also, as discussed above, because of the threat to the U.S. refining industry if it is forced to absorb part of the crude oil equalization tax as a result of competitive pressures from imports, it is necessary to establish a standby process to provide tariff or quota protection if the refining industry's financial viability is threatened.

We recognize that, from a standpoint of legislative jurisdiction, this Committee can only act directly on the first of the two alternatives. However, this first alternative raises the spector of two very worrisome new problems: (1) the public would mistakenly believe that the oil industry is now receiving a tax subsidy—thus leading to a replay of the depletion allowance controversy with all its ill-will; and (2) the Administration would set up a bureaucratic control process that might, in time, force the companies to obtain, in advance of drilling, well by well approval in order to qualify for the funds.

Consequently, we conclude that alternative two is the proper solution. Although this Committee does not have direct jurisdictional authority to legislate such action, we believe it does have the power to cause it to happen. If this Committee now refused to pass the crude oil equalization tax—the heart of the President's

program—until action is taken (1) to eliminate the composite price and (2) to adjust the price of oil oil to at least reflect its present replacement cost, we believe that such action would be forthcoming. We respectfully request this Committee to so act.

EXHIBIT I

SELECTED FINANCIAL DATA FOR MAJOR U.S. INTEGRATED OIL COMPANIES

Company	Assets (billions)[1]	Cash flow from operations (billions)[2]	Reduction in net profit if one-third COET absorbed (percent)[3]	Long-term debt (percent)	Bond rating
Internationals:					
Exxon	$36.3	$4.4	7	17	AAA
Mobil	18.8	1.6	13	27	AAA
Texaco	18.2	1.6	12	22	AA
Standard of California	13.8	1.4	16	18	AAA
Gulf	13.5	1.6	14	14	AAA
Domestics:					
Standard of Indiana	11.2	1.6	17	22	AAA
Arco	8.9	1.0	22	35	AA
Shell	7.8	1.2	26	20	AAA
Continental	6.0	.7	13	28	AA
Phillips	5.1	.8	13	24	AA
Sun	4.8	.6	21	22	AA
Union Oil	4.2	.7	25	31	AA
Cities Service	3.6	.5	19	27	A
Getty	3.6	.6	10	8	AAA
Marathon	3.0	.3	27	47	A

[1] 1976.
[2] Average of 1974–76.
[3] Percent reduction in net profit if ⅓ of the crude oil equalization tax will be absorbed by the refiner, as assumed by the administration, average of 1974–76 data.
[4] Long-term debt as percent of debt to debt plus equity, 1976 data.

Note: Excludes Standard of Ohio because of its special situation relative to North Slope oil.

EXHIBIT II

APPROXIMATE REVENUES AND CASH FLOW FROM PRESENT DOMESTIC AND OIL GAS PRODUCTION AND ESTIMATED CAPITAL INVESTMENT NEEDED TO DISCOVER AND DEVELOP NEW PRODUCTION

[Dollars per barrel]

	1978	1975	1976
Approximate average wellhead revenues	$4.25	$5.15	$6.40
Approximate cash flow after direct cost and taxes	2.50	2.70	3.40
Less 12 percent return on investment	.70	.85	1.00
Net cash flow	1.80	1.85	2.40
Approximate capital investments to discover and develop new production	3.00	3.20	3.50
Deficit	1.20	1.35	1.10

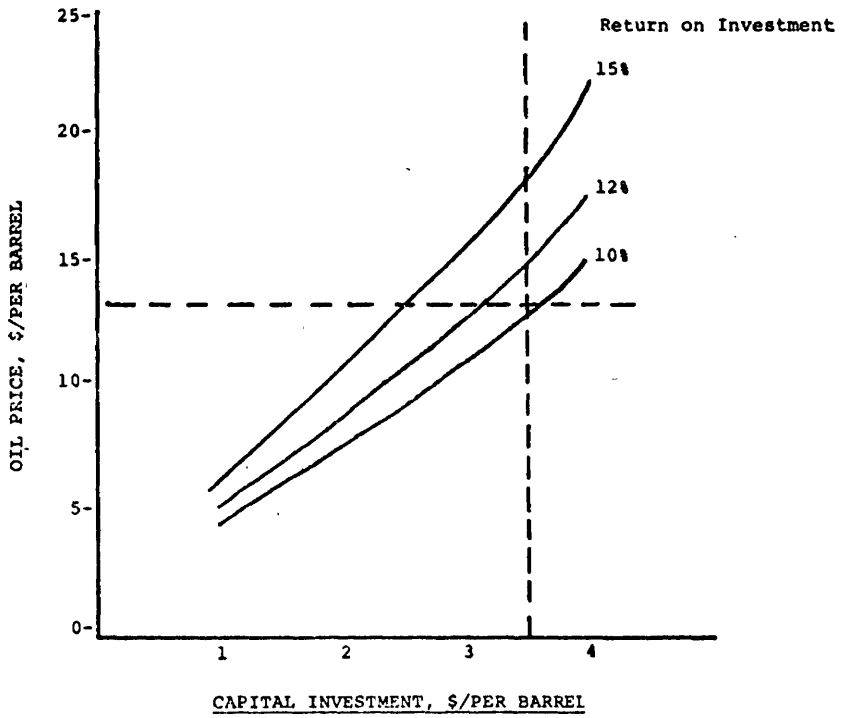
Note: Natural gas converted to crude oil equivalent on Btu energy basis.

Source: Calculated by Union Oil from data published by Department of Commerce, API, and Chase Bank. 1976 partly estimated.

EXHIBIT III

RELATIONSHIP BETWEEN PRICE AND CAPITAL INVESTMENTS TO FIND AND DEVELOP OIL

Typical Offshor Lease
(1977 Dat



STATEMENT OF FARMERS UNION CENTRAL EXCHANGE, INC., ST. PAUL, MINN.

The Need to Retain a Crude Oil Cost Offset for Small and Independent Refiners

PURPOSE

The purpose of this paper is to present the views of Farmers Union Central Exchange, Incorporated (CENEX) concerning the need to retain a crude oil cost offset for small and independent refiners.

FARMERS UNION CENTRAL EXCHANGE

Cenex is a regional farm supply cooperative. The customer-owners of CENEX are 1,300 local farm cooperatives located in 14 states from the Great Lakes to the West Coast. Cenex owns and operates a refinery in Laurel, Montana with a rated capacity of 42,500 barrels per day. The entire output of petroleum products from this refinery is used to supply the energy needs of our agricultural customer-owners.

THE PROBLEM

As the Crude Oil Equalization Tax, as proposed in the National Energy Act, phases-in beginning in 1978; the Entitlements Program, and with it the Small Refiner Bias, phases-out. The Small Refiner Bias was established by FEA as part of the Entitlements Program after careful study and full public and legislative review. The program has served to equalize the small refiner's crude cost with other refiners and to compensate for the advantages enjoyed by major oil companies due to their size and integrated structure.

The Small Refiner Bias has enabled Cenex to compete effectively in the marketplace and to supply products to our agricultural customer-owners at the lowest possible price. The impact of the this program is even more significant for Cenex because as a cooperative, Cenex returns a designated portion of our profits directly to the local cooperatives. Continuation of a crude oil cost offset program is vital for both Cenex and our customer-owners.

A Viable Small Refining Industry Benefits Consumers and Serves the National Interest

Continuation of the Small Refiner Bias, or a similar crude cost offset program benefits consumers and serves the national interest as follows:

1. *Lower product prices.*—The crude cost offset lowers feedstock costs; enhances competition, and results in lower product prices for consumers.

2. *Small refiners are the mainspring of competition.*—This fact was demonstrated by the Senate Select Committee on Small Business in its "Fourteenth Annual Report", an extract of which is quoted below:

"The independent refiner is thus the mainspring of competition within the oil industry. His presence not only has economic benefit to individual consumers in their private capacities, but also has indirect public benefit to them as taxpaying citizens, by assuring a competitive market for the Federal Government in its vast annual purchases of petroleum products."

LOWER PRODUCT PRICES MEAN LOWER FOOD PRICES

Petroleum products are used in almost every phase of agriculture—in tilling, planting, irrigation, fertilizing, weed control, harvesting, processing, and distribution. Thus, the maintenance of competition and the resultant lower product prices play a significant role in the price of agricultural products—a fact of prime importance to the nation as a whole.

All farm cooperative companies who are also refiners qualify as small refiners, and thus, their agricultural customers would all benefit from the continuation of this essential crude cost offset program.

THE CONTINUATION OF A CRUDE COST OFFSET PROGRAM IS NEEDED TO INSURE COMPETITION

The entitlements program and the small refiner bias program were designed not only to equalize crude costs but also to compensate for the major company advantages due to their size and integrated structure. According to official FEA data, the present programs do little more than equalize the small refiner's crude costs. The average post-entitlement crude cost for all small refiners in June, 1977 was less than 1 cent per gallon below that of the major companies.

COMPLAINTS REGARDING "ABUSES" ARE NO LONGER JUSTIFIED

Complaints in recent times regarding "abuses" are no longer justfied in that processing agreements under the small refiner bias were eliminated by FEA effective June 1, 1977. These processing agreements were permitted under the regulations; those companies who did participate acted with the full knowledge of FEA. Should there develop any future abuses (a situation which seems quite unlikely in today's regulatory structure), FEA has full authority to amend its regulations accordingly.

SOLUTION

In order to preserve the position of the small refiner, the Crude Oil Equalization tax should be amended to provide that as to those entitlements given to small refiners under the provisions of 10 CFR 211.67(e), there will be credit or refund

which, for each entitlement, will make up the amount by which the entitlement is diminished in value by reason of the Crude Oil Equalization Tax.

The amendment should be written so that the amount of the credit or refund will be determined on the basis of objective criteria (i.e., the number of entitlements at various levels of refinery runs times the amount of the tax). The Department of Energy could, however, in accordance with regulatory procedures already in place, change any levels of entitlement benefits found to be inappropriate by adjusting the number of entitlements issued at that level.

The amendment should direct that the credit or refund will continue for a one-year period during which the Department of Energy will study the impact of the Crude Oil Equalization Tax on small refiners and make appropriate legislative recommendations to preserve the competitive viability of small and independent refiners.

It is our view that the attached proposed amendment accomplishes these goals. We urge that the Congress adopt this amendment as part of the National Energy Act.

Small Refiner Amendment to Crude Oil Equalization Tax Provisions of H.R. 8444

Insert in Sec. 2031 of H.R. 8444 the following in Section 4987. Crude Oil Equalization Taxes:

(O) CREDIT OR REFUND OF CRUDE OIL EQUILIZATION TAX FOR SMALL REFINER.—

(1) IN GENERAL.—In the case of a refiner who is a small refiner as defined in section 3 of the Emergency Petroleum Allocation Act of 1973, the amount determined under paragraph (2) for any calendar month beginning during 1978—

(A) shall be allowed as a credit against any tax which is imposed by section 4986 (a) or (b) for which the refiner is liable, and

(B) to the extent not allowed under subparagraph (A), shall be paid by the Secretary to the refiner at such times (not less frequently than once each calendar quarter) as the Secretary may by regulations prescribe.

(2) AMOUNT OF CREDIT OR REFUND.—The amount of the tax credit or refund for any smaller refiner in any month beginning during 1978 shall be calculated by multiplying the number of entitlements issued to such small refiner in such month under the provisions of 10 CFR 211.67(e) of the Entitlements Program of the Federal Energy Administration by the national average amount per barrel of the crude oil equalization tax imposed by Sec. 4986 (a) and (b).

(3) STUDY OF TAX EFFECT ON SMALL REFINERS.—

(A) STUDY.—The Secretary of Energy shall within one year of the enactment of this Act conduct a study of the effect of the imposition of the crude oil equalization tax upon the competitive viability of small refiners;

(B) REPORT.— Upon completion of the study under subsection (A)(1), the Secretary of Energy shall submit to the Congress a report of his findings, together with recommendations for such legislation as shall be necessary to preserve the competitive viability of small refiners.

(4) Nothing in this section shall be construed as modifying the authority of the Department of Energy, as successor to the Federal Energy Administration, to determine in accordance with the provisions of the Energy Policy and Conservation Act of 1975 the number of entitlements to be issued to any small refiner at any level of refinery crude oil runs to stills.

WRITTEN SUBMISSION OF THE BUREAU OF SALESMEN'S NATIONAL ASSOCIATIONS, NATIONAL ASSOCIATION OF MEN'S AND BOY'S APPAREL CLUBS, INC., THE NAWCAS GUILD

I. INTRODUCTION

The Bureau of Salemen's National Associations represents 20,000 wholesale salesmen in the women's, children's and men's apparel and shoe industries. The primary concern of the Bureau with regard to The National Energy Act is the use of full-size automobiles in business. For the following reasons, the Bureau respectively requests that H.R. 6831 be amended to permit any excise taxes imposed on a salesman's automobile to qualify for depreciation.

A. Economic contribution of salesmen

The textile industry employs over 1.5 million people; clothing and shoes account for over $79 billion in consumer expenditures. The contribution of wholesale salesmen in these industries cannot be over-emphasized.

B. Travel statistics

The salesmen represented by the Bureau each drive 30,000 to 60,000 miles annually; they use 2,500 to 6,000 gallons of gasoline; they spend an average of 159 nights per year on the road; the average territory comprises 3.5 states, which these salesmen cover 4 to 5 times per year, calling on an average of 85.7 individual stores each trip; they carry up to 18 sample bags that weigh, in total, as much as 1,250 pounds.

C. Type of travel

In the apparel and footwear industries, salesmen perform their indispensable role by calling periodically on retailers of every size, no matter how remote their locations. Depending upon the size of the territory and the seasonal requirements of the merchandise, it is not unusual for a salesman to travel over 40,000 miles a year. Like the hundreds of thousands of salesmen and manufacturers representatives in other industries, safety and security, not to mention health and efficiency, necessitate the use of full-size automobiles.

II. PROVISION ENDANGERS LIVELIHOOD OF SALESMEN

The problem for salesmen in our industries is compounded by the necessity for using full-size cars or vans as mobile showrooms. These are the only vehicles that will accommodate sample bags that, in some instances, contain several hundred items that must be maintained in presentable condition.

The large automobile is, therefore, indispensable to the salesman. It is essential to his ability to earn a livelihood. A provision which in effect bans the availability of larger cars overlooks this need and would effectively take away the salesman's most significant asset.

The House bill (H.R. 6831) makes the full-size automobile a luxury item. Although obviously burdensome, a tax disincentive to restrict the desirability of larger automobiles in itself is not as harmful to the salesman and the industries involved as a tax which cannot be deducted for business purposes. We believe that the denial of any recovery of these substantial excise taxes for income tax purposes will have the effect of a prohibition on the manufacture of these much-needed vehicles. While a tax would tend to limit production of so-called "gas guzzlers," the commercial user could seek through depreciation the partial recoupment of such tax. The denial of any recovery penalizes him twice. His automobile in the eyes of the law becomes a mere personal living expense item under H.R. 6831. The salesman's ability to earn a livelihood is endangered where he cannot recoup the cost of his travel and transportation. It's as simple as that!

III. NO REASONABLE ALTERNATIVES

The Finance Committee must understand that a reasonable alternative to use of a larger car by a salesman of apparel does not presently exist. These are industries in which there is no alternative for sale by sample. Samples must not only be maintained in presentable condition, but must be secured from theft.

IV. CONCLUSION

The Bureau of Salesmen's National Associations recognizes and supports our country's need to conserve energy. However, we urge that this Committee and the Senate not economically destroy those persons whose livelihoods are necessarily dependent upon large automobiles.

STATEMENT OF GATX CORP.

This statement is submitted on behalf of GATX Corporation, its subsidiaries and affiliates, (GATX) a major manufacturer and lessor of railroad freight cars with principal offices located in Chicago, Illinois.

SUMMARY

1. GATX supports the approach embodied in H.R. 8444, the "National Energy Act", of providing tax incentives to encourage energy conservation.

2. GATX believes that the addition of tax incentives will encourage the greater utilization of coal as a principal source of energy in the United States.

3. Specifically, GATX recommends the allowance of an additional 10 percent investment credit with respect to new railroad equipment used by a common carrier or other qualified user for the purpose of transporting coal, and for new shipping equipment used primarily to carry coal to or from ports in the United States. Such additional credit should, as is the case with other property qualifying for the investment credit, also be available as a "qualified lessor" of such equipment.

BACKGROUND

Founded in 1898, GATX maintains its executive offices at 120 South Riverside Plaza, Chicago, Illinois. GATX's principal activity is the supply of railroad freight cars to approximately 900 customers through the ownership, maintenance, and lease for this purpose of a fleet of approximately 62,000 freight cars, principally tank cars.

GATX also operates public terminals at various locations in the United States and abroad with facilities for the storage and handling (including mixing, blending packaging and drumming of liquid commodities) of chemicals, petroleum and other liquid products and certain bulk dry commodities. Additional operations include the design, fabrication and field erection of facilities for storage of various products (principally liquids), and research and development facilities maintained to service GATX's operating subsidiaries as well as the Federal government.

GATX also engages in the ownership, chartering, and operating of nonsubsidized ocean going vessels; the operating of a fleet of Great Lakes vessels; the finance and finance leasing of transportation and industrial equipment in the United States and abroad; and the design, manufacture and sale of pneumatic conveying systems, cooling and heat recuperating equipment, dust and fume control equipment and other industrial equipment.

POSITION ON H.R. 8444

GATX supports those objectives of H.R. 8444 which provide tax incentives to encourage energy conservation. GATX believes that such incentives are cost efficient and will, in fact, achieve vitally needed substantial energy savings.

GATX strongly supports the Administration's proposal to encourage conversion to a greater use of coal, in light of the magnitude of the nation's coal reserves which, if fully utilized, will obviously reduce reliance upon oil and gas.

We believe, however, that stimulus for the effective use of coal also requires incentives both for transportation as well as production, since the nation's coal car fleet is not adequate at the present time. An additional 10 percent investment tax credit for property used to carry coal is, in GATX's experienced judgment, a most effective initiative to reach needed new coal car production. As the Association of American Railroads recently testified before the House Ways and Means Committee with respect to the tax provisions of the energy legislation, it estimates that "from 9,700 to 13,400 coal cars must be acquired annually for the next eight years, depending upon the degree of unit train operations, to handle the anticipated new coal traffic and to replace older cars."

RECOMMENDATIONS

GATX therefore recommends that H.R. 8444 be amended to provide an additional 10 percent investment credit with respect to the following types of equipment used to transport coal:

1. *Railroad equipment.*—The additional 10 percent investment credit should be provided with respect to new railroad equipment used by a common carrier (or other qualified user) to transport coal within the United States. The railroads have been the primary carrier of coal and such credit would provide an incentive for further expansion of their use.

Moreover, the additional investment credit should be available whether the railroad equipment is used by a common carrier as an owner or lessee thereof. Since many railroads may be unable to utilize the credit directly, GATX be-

lieves that this incentive should be available with respect to lessors of railroad equipment, including lessors to public utilities, thus enabling those persons to pass on the incentive to the users (railroads or utilities) in the form of reduced rental. For example, if a full service lessor, such as GATX, is in a position to lease its cars to a public utility, that utility can make them available to a railroad and receive a lower freight rate than would be the case if the railroad supplied the cars. Such savings can, in turn, be passed to the consumer in the form of lower utility charges. Thus, if the energy conservation purposes of the bill are to be achieved, the additional investment credit should be made available in effect to all owners and users of the equipment.

To prevent "tax shelter" abuses, however, GATX recommends that the additional investment credit for leased railroad equipment be limited to corporate lessors.[1]

2. *Coal shipping equipment.*—The additional 10 percent investment credit should be provided for certain "coal shipping equipment." This would be defined as any new vessel, container or other property of a United States person used primarily to carry coal to or from ports in the United States. In certain parts of the United States, such as the Great Lakes region, the most feasible and economic method of transporting coal is often by water. Such additional investment credit should be provided with respect to coal shipping equipment for the same reasons which justify its application to railroad equipment, i.e., since both provide facilities for the transportation of coal. The provision of the credit for coal shipping equipment, as well as railroad coal cars, will permit the ultimate users to provide the most efficient method of handling coal without an uneconomical choice of equipment because of differences in investment tax credit. Although GATX believes that the additional investment credit should be available to both an owner and/or lessee of such equipment, restrictions comparable to those with respect to railroad equipment should limit the credit's availability to additional investment credit in the case of an individual or noncorporate lessor.

CONCLUSION

GATX strongly believes that the allowance of an additional 10 percent investment tax credit for railroad equipment and coal shipping equipment used to transport coal within the United States is consistent with, and would in fact enhance, the necessary conversion of the nation to the use of coal as a principal source of energy. H.R. 8444, if amended in the manner herein suggested, can constitute a major step in achieving this goal.

STATEMENT OF THE SUPERIOR OIL COMPANY

The Superior Oil Company files this statement in support of a provision modifying Section 956 of the Internal Revenue Code.

Section 956 of the Code now provides that if a United States corporation owns more than 50 percent of the stock of a foreign corporation and the foreign corporation makes certain investments in United States property, the amount so invested is to be treated as a dividend to the U.S. corporation.

The Superior Oil Company ("Superior") is a U.S. corporation which owns about 53 percent of the stock of Canadian Superior Oil, Ltd. ("Canadian Superior") a Canadian corporation that is engaged in the exploration for oil and gas in Canada and throughout the world. Canadian Superior's remaining stock is publicly held, and a majority of Canadian Superior's directors are Canadian residents. Canadian Superior has explored for oil and gas off the Outer Continental Shelf of the United States, as well as elsewhere throughout the world.

Since 1964, Canadian Superior has advanced substantial funds to Canadian Superior's wholly-owned U.S. subsidiary for use in the acquisition, exploration and development of interests in Federal oil and gas leases on the Outer Continental Shelf in the Gulf of Mexico, more than 12 miles beyond the coastline of the United States. The U.S. subsidiary was organized because Federal leasing regulations require that such leases be held by a U.S. corporation.

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[1] The additional investment credit for railroad equipment would be available to an individual or other noncorporate lessor only in the two limited situations described in section 46(e)(3) of the Code, i.e., where the property subject to the lease is manufactured or produced by the lessor, or the term of the lease is less than 50 percent of the useful life of the property and the section 162 deductions during the first year of the lease with respect to such property exceed 15 percent of the rental income produced by such property.

The amounts paid for these leases have been paid into the United States Treasury. Any oil or gas discovered on these leasehold interests is sold by Canadian Superior to unrelated U.S. companies.

Superior has derived no tax or other benefit from the expenditures made by Canadian Superior. Indeed, since Canadian Superior and its U.S. subsidiary do not have U.S. income from other sources, the usual tax deductions for the oil and gas exploration and development expenditures by Canadian Superior's U.S. subsidiary in excess of its income therefrom have produced no tax benefit. Superior could not properly prevent Canadian Superior, with 47 percent of its stock publicly held, from using Canadian Superior's own funds to acquire oil and gas leases on the Outer Continental Shelf or elsewhere in the world if Canadian Superior considered it desirable to do so.

Superior believes that it was not the intent of Section 956 to cause the expenditures made by Canadian Superior on the Outer Continental Shelf in the ordinary course of its business of exploring for oil and gas to be taxable as dividends to Superior. If Canadian Superior's expenditures in past years were taxable to Superior when made, then under Section 959 of the present law dividends in corresponding amounts paid by Canadian Superior to Superior in future years would be tax-free. The uncertainty of the status of the past expenditures also produces uncertainty as to the tax status of future distributions.

The Tax Reform Act of 1969 added Section 638 to the Internal Revenue Code to provide that for certain purposes the Outer Continental Shelf, even though outside the 12-mile limit, should be treated as being within the United States. It does not appear that Congress contemplated the effect this amendment might have in broadening the scope of Section 956 when the amendment was enacted in 1969. Accordingly, Superior requests the adoption of legislation which provides that investments in property situated on or used exclusively in connection with the Outer Continental Shelf made by foreign corporations subsequent to the Tax Reform Act of 1969 will not be treated as dividends to their U.S. shareholders.

Superior believes that this provision is fair and reasonable and respectfully urges its enactment.

DANZANSKY, DICKEY, TYDINGS, QUINT & GORDON,
Washington, D.C., September 19, 1977.

Hon. RUSSELL B. LONG,
Chairman, Committee on Finance,
U.S. Senate, Washington, D.C.

Dear SENATOR LONG: On behalf of Thermal Ventures, Inc., a corporation formed to develop and perfect a new energy efficient radiant heat concept, we submit this letter and the attached paper "Memorandum in Support of Incorporating Recently Developed Energy Efficient Infra-Red Radiant Thermogenic Process Within the Scope of the Proposed Residential Energy Credit and Business Energy Credit Provided For Under the National Energy Act (S.1472)," as our testimony on the proposed amendments to the Internal Revenue Code of 1954 provided for under the Comprehensive National Energy Policy. We respectfully request that this testimony be entered into the records of hearings held recently by the Senate Finance Committee on this subject.

The single major point that we wish to make to the members of the Senate Finance Committee is as follows:

We are in total agreement with the Administration's use of tax incentive credits to stimulate investment by individuals and businesses in energy-conserving devices. However, it is our contention that Senate Bill S.1472, in its present form, lacks flexibility insofar as it fails to take into consideration innovative energy-conserving devices currently being developed or yet to be developed, such as Thermal Ventures, Inc.'s "Deltherm Thermogenic Heating Process," a low intensity infra-red radiant heating system which has experimentally produced fuel savings in excess of 50 percent over existing electrical heating systems.

In the attached statement we have proposed amendments to Senate Bill S.1472 which we feel will alleviate the inflexibility of the bill's tax credit provisions. The field of energy conservation is a rapidly advancing field and we strongly believe that legislation in this area must be structured so as to encourage the development of innovative answers to this nation's energy problems.

Sincerely,

LOUIS H. DIAMOND,
(For the Firm).

Attachment.

STATEMENT OF THERMAL VENTURES, INC.

MEMORANDUM IN SUPPORT OF INCORPORATING RECENTLY DEVELOPED ENERGY EFFICIENT INFRA-RED RADIANT THERMOGENIC PROCESS WITHIN THE SCOPE OF THE PROPOSED RESIDENTIAL ENERGY CREDIT AND BUSINESS ENERGY CREDIT PROVIDID FOR UNDER THE NATIONAL ENERGY ACT (S. 1472)

I. Introduction to Thermal Ventures, Inc.

Thermal Ventures, Inc., is a Maryland corporation which was organized to acquire, perfect and market an invention which represents a revolutionary development in the field of energy conservation relating to the heating of buildings and other structures. The management and technical advisors to the corporation anticipate that within the next decade the introduction of their product will change the entire concept of heat production in the United States and throughout the world. The corporation and its employees are devoted to reducing and eliminating this country's dependence upon other nations for the supply of energy resources and strongly believe that the United States Government should take an active role in encouraging the development of new and innovative energy-conserving devices.

II. Statement of Position

The Administration and both Houses of Congress have proposed the establishment of a residential energy tax credit and a business investment tax credit which are designed to stimulate public investment in various energy-conserving devices. We believe that the tax credit provisions in their present form have inadvertently disregarded a very significant discovery within the field of energy conservation. Therefore, we propose that the energy tax credit provisions be structured so as to include within the definition of the various qualifying energy-conserving devices the recently developed "Deltherm Thermogenic Heating Process," a low intensity infra-red radiant heating system which in a controlled experimental setting has produced estimated fuel savings in excess of 50 percent over existing electrical heating systems and which has received the recommendation of the United States Department of Commerce (National Bureau of Standards) to receive federal funding through the Energy Research and Development Administration. Further, we propose that these provisions give the Secretary of the Treasury flexibility in drafting regulations in this area so as to allow tax credits on the purchase of other innovative energy-conserving devices yet to be discovered. This restructuring of the tax credit provisions of the National Energy Act may be accomplished by way of the following amendments to Senate Bill S. 1472:

A. Internal Revenue Code § 44B(c)(4), created by § 1101 (Residential Energy Credit) of Senate Bill S. 1472, shall be amended to read as follows:

"(4) OTHER EENERGY-CONSERVING COMPONENT.—The term 'other energy-conserving component' means any item (other than insulation)

"(A) which is—

"(i) a replacement burner for a furnace, which burner is designed to reduce the firing rate or to achieve a reduction in the amount of fuel consumed as a result of increased combustion efficiency,

"(ii) a device for modifying flue openings which will increase the efficiency of operation of the heating system,

"(iii) an electrical or mechanical furnace ignition system which replaces a standing gas pilot light,

"(iv) a storm or thermal window,

"(v) a clock thermostat,

"(vi) caulking and weatherstripping of exterior doors and windows, but only if installed in conjunction with insulation or at least one other energy-conserving component,

"(vii) an infra-red radiant heating system which has been certified by the National Bureau of Standards of the United States Department of Commerce as a system that is substantially more efficient than conventional heating systems, and

"(viii) an item of a kind which the Secretary specifies by regulations as increasing the energy efficiency of the dwelling.

"(B) the original use of which begins with the taxpayer, and

"(C) which can reasonably be expected to remain in operation for at least 3 years."

B. Internal Revenue Code § 48(1)(7), created by § 1301 (Business Energy Credit) of Senate Bill S. 1472, shall be amended to read as follows:

"(7) ITEMS TO BE INCLUDED.—In prescribing the regulations under paragraph (1), the Secretary, in consultation with the Federal Energy Administrator, shall include, but not be limited to, the following items:

(A) recuperators;
(B) heat wheels;
(C) regenerators;
(D) heat exchangers;
(E) waste heat boilers;
(F) heat pipes;
(G) insulation;
(H) double glazing;
(I) heat pumps;
(J) reflective glass coatings;
(K) automatic energy control systems;
(L) turbulators;
(M) preheaters;
(N) combustible gas recovery systems;
(O) economizers; and
(P) infra-red radiant heating systems.

However, in the event that the Secretary, after consultation with the Federal Energy Administrator, determines that any class of property described in subparagraphs (A) through (P) does not meet the criteria set forth in paragraph (1)(D), the Secretary is not required to identify such class of property in the regulations prescribed under paragraph (1)."

III. Description of the "Deltherm Thermogenic Heating Process"

The "Deltherm Thermogenic Heating Process" (hereinafter referred to as the "Deltherm Process") was designed by Dr. Harold Ellis and is based upon the efficient utilization of an extremely basic form of energy—radiant energy. Radiant energy is that energy which is transmitted in a wave motion and in its most basic form is demonstrated when sunlight streams through a closed window and heats the object it strikes without directly affecting the temperature of the surrounding air. This well-known phenomenon, caused by the infra-red rays of the sun, has been incorporated into the Deltherm Process by way of the utilization of invisible heat rays.

The Deltherm Process is a low intensity infra-red heating system which consists primarily of a high thermal efficiency electrically conductive paint bonded to a Mylar surface with parallel busbar electrical connections (hereinafter referred to as "Mylar Panels"). The conductive paint converts standard line voltages into infra-red radiant energy and emits an energy wavelength in a region of the electromagnetic spectrum where absorption by water vapor in the air is minimal.[1] As a result, the energy produced by the Deltherm Process is absorbed by the solid objects in a room rather than by the air, and the net energy to produce a comfortable level of warmth for solid objects is thereby reduced.

A. Evaluation of the deltherm process by Government agencies and private industry

Various government agencies and several private industrial firms have expressed an interest in the development of the Deltherm Process. In fact, the Deltherm Process has been extensively tested and evaluated by several of these interested parties and the following represents a summary of their findings:

1. *Potomac Electric Power Company ("Pepco")/Thermal Ventures, Inc.* ("TVI").—Pepco and TVI have jointly sponsored an experimental project involving the installation and monitoring of the Deltherm Process within a television warehouse in Kensington, Maryland. Although more extensive testing is planned for the winter of 1977–78, preliminary investigation has produced the following results:

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[1] Infra-red radiation occupies the wavelengths between 7,800 and 4,000,000 Angstroms. In general, infra-red radiation is rapidly absorbed by water vapor and to some extent carbon dioxide. However, the bandwidth between 7,800 and 14,000 Angstroms is a band of transparency for water vapor. Since the paint ingredients selected for the Deltherm Process were chosen to produce a radiating center of 13,500 Angstroms, most of the radiant energy transmitted by the Process will arrive at the room surfaces and will not be absorbed by the air.

(*a*) If the ten Mylar Panels placed in the warehouse were to operate 24 hours a day, 7 days a week, 30 days a month, the cost of electrical operation would be approximately $172.00 as compared to the $648.00 cost of operating the forced hot air system which was normally utilized in the warehouse (i.e., a net savings of 74 percent);[2]

(*b*) Shefferman & Bigelson Company, a firm of consulting engineers commissioned by TVI to analyze the Pepco warehouse data, have stated that—

"[i]t is safe to assume that the Deltherm system would result in annual fuel savings in excess of 50 percent over normal electric heating systems. The early Pepco results, while not definitive, seem to indicate that the annual fuel savings over the in-space heating system may be in the neighborhood of 55 percent to 65 percent."[3]

2. *United States Department of Commerce; National Bureau of Standards* ("NBS").—Pursuant to the provisions of Section 14 of the Federal Nonnuclear Energy Research and Development Act of 1974, the National Bureau of Standards has evaluated the Deltherm Process and has recommended it for government support through the Energy Research & Development Administration ("ERDA").[4] The NBS analysis reveals the following:

(*a*) Donald Marlowe of NBS states the following in his June 13, 1977, presentation of the "Final Technical Review" for the Deltherm Thermogenic paint:

"The Deltherm system appears to be well engineered and is capable of reducing energy consumption by as much as 30 percent in space heating applications where baseboard or radiant heating panels are now in use. . . . For certain types of usage . . . this type of radiant heating may be a substantial improvement over any system now available . . . [Furthermore, it] is likely that, on a production basis, the unit cost of a Deltherm system will be very competitive with existing units."

(*b*) The consulting firm of Northrop Services, Inc. ("Northrop"), commissioned by NBS to evaluate the Deltherm Process, provided a comparative analysis of various energy alternatives and concludes that "[n]o other heating unit appears to have the flexibility and versatility of the DELTHERM." In comparing the Deltherm Process with standard electric and baseboard heaters, Northrop indicates that "[e]nergy savings based on air temperature comparison will vary from *50 to 75 percent* (*conservative*)." [Italics added.][5]

3. *Miscellaneous studies.*—At the date of this memorandum, the following organizations have either commenced testing the prototype units of the Deltherm Process or have expressed an interest in doing so:

(*a*) Department of the Navy—Naval Air Test Center;
(*b*) National Aeronautics and Space Administration;
(*c*) Department of the Army—Advanced Concepts Team;
(*d*) Commonwealth Edison Company; and
(*e*) Sears, Roebuck & Company.

B. Deltherm process; alternative uses

The Deltherm Process may be utilized wherever heat is applied, be it by radiation, conduction or convection. The degree of heat is easily controllable by varying either the amount of paint applied or the voltage, or by utilizing a variety of electrical circuitry installations, including temperature control thermostats or timers. The materials utilized in constructing the Deltherm Process are all inorganic and non-toxic and the resulting Mylar Panel is impervious to moisture and is schockproof.

The Mylar Panel unit may be easily transported in a mailing tube and is installed by placing the Panel over standard fiberglass insulation with heat resistant tape and plugging it into a standard socket. Since the whole surface

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[2] These calculations have been estimated by officials at TVI based upon data furnished to them by Pepco. Pepco officials have not to date provided a written evaluation of the Deltherm Process although their findings could be confirmed by oral testimony should the Senate Finance Committee request such information.

[3] Statement contained in a letter from S. M. Shefferman to Jerry Wolman, President of TVI, dated Apr. 5, 1977 (see materials assembled in Exhibit A).

[4] See Appendix A, "National Bureau of Standards—Technical Review." Note, that according to George P. Lewett, Chief of the Office of Energy-Related Inventions at the National Bureau of Standards, only 2 percent of all inventions submitted to NBS for evaluation are eventually recommended to ERDA.

[5] See materials assembled in Appendix A.

area of the Panel becomes the heat emitter, instead of all the heat being concentrated in several thin wires, the Deltherm Process tends to operate at much lower temperatures; 120° to 180° Fahrenheit versus the glowing 1500° Fahrenheit of resistive heaters. This increases safety and cleanliness, and reduces the likelihood of fire.

In addition to heating residential and commercial buildings, the Deltherm Process may be utilized for, among others, the following purposes:

1. Spatial radiant heating of all types and for all uses, indoor and outdoor;
2. Surface heating and heat-transfer applications to air, gases, water, liquids, and solid surfaces;
3. Heating of swimming pools, fish aquaria, ponds and lagoons, water troughs and other bodies of water;
4. Use in conjunction with clear-top stoves, hot-table food serving, hot plates and beverage warmers;
5. Use in conjunction with industrial ovens for drying, baking or shrinking;
6. Engine and battery heating to prevent congealing or lubricating of oil and maintaining batteries at optimum temperature efficiency;
7. Aircraft wing de-icing;
8. Cargo space temperature control in aircraft, trucks, vans, containers, ship holds, railway cars and buildings;
9. Roadway, driveways, stairs, bridges, walkways, roofing, piping, pipelines, storage tanks and vessel snow-control and de-icing;
10. The control of barnacles, algae, and other forms of marine growth on ships and aquatic and marine structures, including intake watercooling pipes for nuclear and conventional power plants.
11. Maintenance of terrestrial, marine, submarine, and aerial signalling and navigation devices;
12. Maintenance of aircraft landing approach homing displays and controls;
13. Heating of voltage transformers and battery charges;
14. Maintenance of wireless sheet conductors for illumination displays, light bulb contacts, visual control boards, decorative panels, and electrical and electronic circuitry; and
15. In cosmetology for hair dryers, electrically heated rollers, and the like.

IV. The Deltherm process; impact on national energy policy

A. National policy goals

Upon submitting its National Energy Plan to Congress, the Administration specifically indicated that it was seeking to:[6]

1. Reduce United States dependence on oil imports and vulnerability to interruptions of foreign oil supply;
2. Lower the rate of growth of total United States energy demand and make the U.S. stock of capital goods more energy efficient; and
3. Shift industrial and utility consumption of oil and natural gas to coal and other abundant resources.

The Administration's Plan states that

"[c]onservation and improvement in energy efficiency is the most practical course of action for the United States and for the nations of the world. Conservation is cheaper than production of new energy supplies, and is the most effective means for protection of the environment. Conservation and improved efficiency can lead to quick results."[7]

In attempting to achieve its goal of improving the energy efficiency of the nation's residential and commercial buildings, the Administration has suggested establishing tax incentive credits for those individuals and entities who make various energy conservation expenditures. The residential energy credit consists of credits for insulation, storm windows, clock thermostats, and energy-saving furnace modifications. The business energy credit provides incentives to purchase energy-saving equipment such as insulation, double glazed windows, energy control systems and efficient heat exchangers.

B. Potential impact of Deltherm process on national energy goals.

The evidence contained within this memorandum clearly shows that the Deltherm Process is a viable and energy-efficient alternate method of heating. The

[6] CCH Energy Management, issue No. 207, May 4, 1977, p. 95.
[7] *Id.* at 28–29.

advantages it has displayed include: (1) efficiency in utilizing electrical energy; (2) low cost of materials and application; (3) ease of installation and maintenance; (4) rapid, efficient and even distribution of heat; and (5) flexibility and simplicity in design of appliances without the use of fans and blowers, and without dirt and dust contamination of surroundings.

The conversion of existing heating systems to the Deltherm Process or a comparable infra-red radiant heating system would result in a decrease in the overall demand for energy and shift residential and industrial consumption of oil and natural gas to coal and other available energy-producing resources,[8] thereby reducing U.S. dependence on foreign oil supply. In short, the Deltherm Process complements the Administration's National Energy Plan in every conceivable way.

Senate Bill S.1472, in its present form, places emphasis upon seeking alternative sources of energy (e.g., solar energy, coal burning equipment, etc.) and upon reducing the waste of existing energy (e.g., insulation, storm windows, etc.). The Bill fails, however, to provide adequate incentives for the move efficient production of existing sources of energy. An infra-red radiant heating system, for instance, may provide many of the answers to the nation's energy problems; yet, without adequate incentives, the owner of a residential or commercial building will not incur the substantial initial expense of converting from his present heating system to a more efficient one. It is for this reason that we propose that the residential energy credit and business energy credit provisions of the existing Senate Bill S.1472 be amended to include within the definition of qualifying energy conserving devices the recently developed Deltherm Process which has produced estimated fuel savings in excess of 50 percent over existing electrical heating systems. Such an amendment would not only advance the objective of energy efficiency and conservation but would also be consistent with the Administration's attempts to protect the environment.

We propose as a secondary alternative that, at least, these provisions be structured to give the Secretary of the Treasury flexibility in drafting regulations in this area so as to allow tax credits on the purchase of qualifying innovative energy-conserving devices such as the Deltherm Process and others yet to be discovered or publicized. In this regard we urge the Committee on Finance to adopt the language equivalent to that contained within Sections 2011 and 2061 of H.R. 8444, which would permit the Deltherm Process and other innovative and meritorious devices presently being developed to qualify as energy-conserving improvements eligible for the residential and business energy credits. We believe that the problem here being focused upon requires innovative answers, such as the Deltherm Process, and that, therefore, any incentive bill, such as S.1472, should be designed to be as flexible as possible.

Appendix A

U.S. Department of Commerce,
Natural Bureau of Standards,
Washington, D.C., June 16, 1977.

Mr. Richard K. Sutz,
Chief, Office of Energy Related Inventions Program, Office of Industry Relations, Energy Research and Development Administration, Washington, D.C.

Dear Mr. Sutz: We wish to call your attention to an invention entitled "Delphic Thermogenic Paint" which was submitted to us by Dr. Ellis, Delphic Research Laboratories, Inc. for evaluation under Section 14 of the Federal Nonnuclear Energy Research and Development Act of 1974.

Our evaluation has been completed and we recommend this new type of radiant heater as an invention which is technically valid and worthy of consideration for appropriate Government support. The enclosed evaluation report is provided for your use in planning for support of this invention.

This thermogenic paint can be used to manufacture electrical resistance radiant space heaters which will provide a greater sensible warmth at a 30 percent savings of electrical energy than other presently available radiant panel or base-

[8] Electricity has the potential for utilizing low grade coal, nuclear energy, hydroelectric power, low grade fuel oils, etc. Essentially, this flexibility can result in total independence from foreign fuel supply if capital is invested in power plant capacity utilizing an abundantly available fuel source (e.g., coal). See appendix A.

board space heaters. The evaluation was conducted in two stages. During the first stage, opinions were obtained both from within and outside NBS. In the second stage, the validity of the claimed energy savings was established and the performance of heaters fabricated using this process compared with several other available radiant heaters. The inventor cooperated with the evaluator in attempts to gain access to some electrical power usage data which was being generated by a local public utility which also was evaluating the invention. Mr. Donald Marlowe was our staff evaluator for this invention.

Our report is divided into Tabs A, B, and C. In Tab A, Mr. Marlowe summarized the technical aspects of this invention. Tab B is a second-stage evaluation report submitted by Northrop Services, Inc. of Arlington, Virginia. Tab C contains a copy of the evaluation request form submitted to us by the inventor along with copies of the invention disclosure and other inventor-supplied material used in the evaluation. We will be most happy to discuss this matter with you at your convenience.

We are enclosing a copy of our letter to Dr. Hal Ellis advising him of this recommendation.

Sincerely,

GEORGE P. LEWETT,
Chief, Office of Energy-Related Inventons.

Enclosures.

TAB A—FINAL TECHNICAL REVIEW

(By Mr. Donald Marlowe, NBS/OERI)

DELTHERM THERMOGENIC PAINT (OERI NO. 001588)

Introduction

The invention "Deltherm Thermogenic Paint" submitted by Dr. Hal Ellis, president of Delphic Research Laboratories, Inc., is a surface covering which may be applied to a variety of surfaces by various bonding agents. The paint directly converts standard line voltages into infra-red radiant energy in a portion of the infra-red spectrum carefully chosen to avoid absorption by water vapor in the air. In this manner the coating applied to walls, ceilings, partitions, etc. effectively warms the surfaces of the objects in the room directly without initially affecting the air temperature. This material is therefore suitable to application as a heating element whenever radiant heating is required and for other applications which might make use of the sheet electrical conductivity properties of the paint. Location of heaters manufactured from this material is limited only by the possibility of touching a high temperature surface. These heaters must be located out of reach. For low temperature elements, this precaution is unnecessary. Present manufacturing techniques require that this paint be applied professionally.

Description

The Deltherm Thermogenic Paint and heating system which was evaluated consists of a thin conductive paint bonded to a Mylar surface with parallel busbar electrical connections. Heating panels are designed for standard voltage input of 120 to 240 volts AC nominal. The composite ingredients of the paint, given in the two patents contained in the inventor's disclosure, are readily available chemicals. The crystalline graphite of the paint is in the form of platelets which overlap each other. They and the other paint ingredients, mainly maganese dioxide, produce a highly conductive path. The platelet size and ingredient mix determine the radiating frequencies of the energy. Heater output wattage is determined by the density of the paint coat applied.

The heat system which was demonstrated to the second-stage evaluator consisted of a series of Mylar panels to which the paint had been applied. These were mounted on the ceiling of a warehouse structure. The heater provided the only heat input to the large storage area. The individual panels are flexible, and are easily transported in a rolled condition. Back-side radiation losses are reduced by installing the heater element over fiberglass or other insulating material.

Discussion

The claimed energy saving advantages of the Deltherm Themogenic Paint heating system are considered valid. The fragmentary experimental data which is available at the time this report is written indicates that energy savings of

30 percent can be reasonably expected when this system is compared to other electrical heating systems. It appears that this increase in efficiency has been accomplished through the selective control of the carbon platelet size in the paint mixture. This has resulted in a paint which radiates heat energy with a wavelength of appromixately 1.35×10^{-4} m. This energy wavelength is in a region or window in the electromagnetic spectrum where it is not absorbed by water vapor in the air. As a result the energy is absorbed by the solid objects in the room rather than the air and the net energy to produce sensible warmth for solid objects is reduced.

There are, however, difficulties anticipated in the use of this type of radiant heater. Because the energy is not absorbed readily by the air, meaurements of room air temperature do not give a realistic determination of the thermal comfort of the space being heated. Installation of Deltherm must be carefully engineered with the usage of the space to prevent hot or cold spots. These might occur, for example, if a seated person were shadowed from the heater by a room divider or file cabinet. Consideration must be given to the use of ceiling heating units in addition to lighting. It is possible that the average consumer, used to conventional convective heat, will not react favorably to purely radiant heat.

Conclusions

1. The Deltherm system appears to be well engineered and is capable of reducing energy consumption by as much as 30 percent in space heating applications where baseboard or radiant heating panels are now in use. The experimental data which will quantify the amount of energy savings which might be expected are currently being gathered at several test sites around the country.

2. It is likely that, on a production basis, the unit cost of a Deltherm system will be very competitive with existing units. The raw materials are relatively inexpensive and are generally available in the quantities needed.

3. For certain types of usage which are cited in both the inventor's disclosure, Tab C, and in the second-stage evaluation report, Tab B, this type of radiant heating may be a substantial improvement over any system now available.

Recommendations

The requests by the Delphic Research Laboratories as expressed in the invention disclosure are not very explicit. Before this product can come into widespread use, certification by Underwriters Laboratory and other independent testing laboratories must take place. In addition, work on colored pigments which can be added to the paint to make it more decorative without reducing its efficiency must continue. These needs, and a set of estimated costs, were discussed by the inventor and second-stage evaluator. Appendix D to Tab B is the result of this discussion.

It is recommended that ERDA consider the requests by the Delphic Research Laboratory, Inc. and take steps to gain access to the above mentioned experimental data now being gathered.

Tab B—Second Stage Report on Deltherm Thermogenic Paint (Heat Film)

(By Northrop Services, Inc.)

SECTION 1—DESCRIPTION OF INVENTION AND INTENDED USE

The invention is a thermal paint which may be applied to a variety of surfaces by various bonding agents. The paint directly converts standard line voltages into radiant energy (infrared) in a spectral pattern carefully chosen to avoid energy absorption by water vapor in the air. In this manner, the coating, applied to walls, ceilings, partitions, etc., efficiently warms objects in the room directly without initially affecting the air temperature.

Since hot air and not heat rises, the converted energy is efficiently utilized directly and the initial heating pattern of the room may start with the floor as the warmest area. The final thermal pattern may then provide a more uniform heat distribution than other systems as the lower surfaces warm the air (in a secondary action) which then rises. However, the warmest points remain the surfaces because of the slowness of heat transfer.

The heat coating may be applied in any pattern or shape. Location is limited only by the possibility of touching a high temperature element. These must be

located out of reach. For low temperature elements, this precaution is unnecessary. Present manufacturing techniques require that this paint be applied professionally.

SECTION 2—TECHNICAL REVIEW

2.1 Scope

The concept of thermal paint as presented in the two patents, numbers 3,999,040 and 3,923,697, lends itself to many prospective applications. Eight design areas with their energy saving applicability noted are discussed briefly in Appendix A. Appendix B contains a list of applications as chosen by Delphic Research Laboratories. This second list contains a number of items that do not lend themselves to energy considerations, have long developmental lead times, or would need market demand researched before proceeding.

This report analyzes only the demonstration units undergoing evaluation and istalled at the warehouse site in Kensington, Maryland. Alternate usages are on display at this location but are not undergoing formal testing at this time. Additional testing sites are listed in Appendix D. Data on these test programs are not yet available.

2.2 Design

2.2.1 Overview

The Deltherm heat system consists of a thin conductive paint bonded to a Mylar surface with parallel busbar electrical connections. Panels are designed for a standard voltage input of 120 or 240 volts a.c. nominal.

The unit may be easily transported in a mailing tube. Installation consists of applying the unit over standard fiberglass insulation with heat resistant tape and plugging into standard sockets. As presently developed, it is not capable of installation by the non-professional.

2.2.2 Paint Composition

The composite ingredients given in the two patents contain standard, readily available chemicals. The crystalline graphite of the paint is in the form of platelets, which overlap each other. They and other paint ingredients produce a highly conductive path. Platelet size and ingredient mix determine the radiating frequencies.

The chemicals of the conductive vehicle (as distinguished from the binder) are stable, inert, consistent, reproducible and relatively indifferent to temperature and humidity changes. The mix of metallic oxides with crystalline graphite balances the negative resistive temperature coefficient of carbon with the positive temperature coefficient of the metallic compounds to eliminate current surges during the start up period.

2.3 Operational considerations

The use of panel heating differs from most conventional heating in that it does not provide a strong positive house pressure relative to the outside air. While this creates a nearly dust free atmosphere there is the possibility of stuffiness due to limited air changes. To combat the lack of fresh air, a small whisper fan should be provided which changes the air periodically.

Water vapor also would need to be provided under some circumstances. However, the relative heating and cooling with limited air motion would cause each area to retain (and precipitate when cooled) most of its original moisture content.

Furnace areas and localized fuel storage areas would be reduced. Ducting would shrink. Electric power inputs would increase but control and distribution would use only a small space and they can be externally located.

Totally sealed rooms would be feasible with input and output air exactly balanced (pressure and volume) to provide needed oxygen replenishment.

Room by room (or area by area) control would be provided by manual adjustment. One could heat only the area in which warmth is required in much the same manner as turning lights on in a specific location.

SECTION 3—STATE OF THE ART AND ALTERNATIVES

3.1 State of the art

No other heating unit appears to have the flexibility and versatility of the Deltherm. However, some energy alternatives exist and are discussed below.

3.2 Aztec unit

3.2.1 Overview

The Aztec panel, manufactured by Aztech International Ltd., is the only commercially available, viable alternative to the Deltherm unit. Six other manufacturers exist and maintain catalog listings but do not promote their product. Sales of these competing units are on the order of $10,000 annually per company. Aztech anticipates sales of $1 million in fiscal year 1977 with $160,000 spent on marketing. Sales promotions are made on such features as safety, life cycle costing, supplemental heating, and other market economics.[1]

The Aztec panel is made up of two sheets of asbestos paper enclosing a layer of graphite. This sandwich is padded with fiberglass and encased in a steel panel. The front panel is coated with epoxy, then sprinkled with fine sand and painted with water based latex, acrylic or casein paints.[2] The graphite layer is pressed carbon operating as a resistive heating element. The surface sand increases the effective radiating surface area and enables the panel to operate at a lower surface temperature.

3.2.2 Design features

The Aztec units are well built, well packaged and ruggedized. There is no reason to suppose that the 10-year warranty will represent other than a minimal operating life. They are more energy efficient than presently marketed panels. They are easily replaced, being plug in panel units. All units operate at lower surface temperatures than other brands at the same wattage input. The sand increases the radiating surface area without changing the overall dimensions. Floor units are safe and effective.

3.2.3 Design limitations

The Aztec is essentially a superior resistive element design. It is a variation of the imbedded wire and portable or baseboard heater. Although the manufacturer stresses the radiant spectral aspects of his product, they show only the spectral benefits of sand over baked enamel in his literature. The sand is used by the manufacturer to lower surface temperatures and improve safety aspects. Because of its application energy efficiencies are increased.

3.2.4 Comparison between Deltherm and Aztec units

A critical design feature is the choice of graphite particle shape. The use of carbon black (acetylinic or channel) in the Aztec unit produces resistance on the order of 0.06 ohms cm. The platelet carbon of the Deltherm unit is rated at 0.0016 ohms cm for the same area considerations. The lower conductivity (high resistivity) of the Aztec heater requires a higher voltage to overcome transitional resistance hence the need for narrower busbar spacing. This makes the Aztec design more width and shape limited than Deltherm.

The figures given below are, of necessity, obtained from the Deltherm and Aztec manufacturers. While the comparison would need additional verification, calculations verify the Deltherm design is specifically formed for infrared production in a chosen spectral region. The Aztec unit is a modified resistive element which, while increasing favorable infrared production, is basically a convection heater.

PANEL COMPARISON

	Aztec	Deltherm
Time to reach stable surface temperature.	85 min	10 min.
Wattage after 2-h warm up	0.84 W/in^2	0.84 W/in^2.
Surface temperature	140° F (insulated)	210° F (uninsulated), 250 to 260° F (insulated).
Weight 2 ft by 3 ft (insulated, framed)	17 lb	4 lb.
For 140° F surface temperature	522 W (measured), 500 W rated	325 W.
Method of increasing wattage output	Increase surface area, with surface temperature held to 325° F (270 V nominal).	Increase either surface area or density of paint.*

* Increases in surface temperature are linear with watt-density between 0.1 and 1.4 W/in^2. Densities between 1.4 and 3.4 have convection and conduction components becoming prominent. Surface temperature is 430° F at a watt density of 3.4 W/in^2. 4 bonding agents for the conductive pigment will allow a choice of surface temperatures in the range of 325°F to 1,000° F.

[1] Extracted from Business Week, Jan. 20, 1977.
[2] Source, Aztech literature.

3.2.5 Conclusion

The Deltherm unit uses 325/522=65 percent of the power the Aztec uses under the same conditions to reach the same surface temperature. This presupposes that the heating is based solely on conduction and convection currents. The infrared heating produced by the Deltherm unit is over and above this stated power requirement. Therefore, the power needed for equivalent heat is less than that indicated.

3.3 Panelectric system

3.3.1 Overview

The Panelectric system is a widely used resistive cable ceiling radiant heat system produced by National Gypsum Company Gold Bond line. Operations are quite satisfactory, but costs of this inefficient radiator make present sales under $10,000.

3.3.2 Comparison with Deltherm

The Panelectric system is designed for 15 watts per square foot to reach a surface temperature of 90°F. The Deltherm coating will achieve the same temperature with 7 to 8 watts per square foot. An energy savings of 50 percent may be realized with the Deltherm in this application. Since this is an inefficient range for the Deltherm unit greater energy savings will be present if it is operated at higher temperatures using smaller surface areas.

3.4 Electric and baseboard heaters

3.4.1 Overview

Comparisons with such a range of units must, of necessity, be very general. The standard electric heater operates close to the visible light spectrum with most of the infrared frequencies in the water absorptive spectrum. Consequently, most of the infrared warms the water vapor in the air and these heaters must rely on conduction and convection for energy transfer. For this reason many units are equipped with fans. Uncomfortable skin temperatures can be observed by sitting too close to such a heater. All such units are an electrical hazard from spilled liquids and a fire hazard if the heating element is exposed.

3.4.2 Comparison with Deltherm

The Deltherm unit uses much lower watts-density on the floor models. This makes skin contact less hazardous. Liquids may be spilled on the unit without harm. Punctures may occur without hazard in any normal house or office environment without damaging electric shock. Energy savings based on air temperature comparison will vary from 50 to 75 percent (conservative).

SECTION 4—COMMERCIAL VIABILITY AND PRACTICALITY

4.1 Commercial interest

The inventor has been able to interest a variety of operations to test the prototype units. Three excellent sources are presently monitoring data. Two of these, the U.S. Army and The Commonwealth Edison Company, will not have completed testing until after this document is submitted. The Kensingon, Maryland (Thermal Ventures) warehouse site has early data from crude instrumentation showing better than 50 percent savings over the standard electric heater-blower unit installed by the warehouse builder. The Potomac Electric Power Company (PEPCO) has installed sealed monitoring units with more definitive instrumentation but they are still measuring only air temperature and not comfort index These instruments indicate costs at 30–35 percent of normal costs.

Pepco has never previously endorsed a product. They are considering endorsing this one. They will not release their preliminary findings other than verbally until a policy determination has been made.

Appendix C consists of letters from an independent consulting firm hired to evaluate the warehouse project and a letter from the warehouse tenant to Pepco stating the conditions of the test. During the unusually severe 1976–1977 winter, operations were extremely satisfactory to the tenant. Giant Food Stores, a local Washington, D.C. chain plans to install Deltherm units in one of their stores if the Pepco results are positive.

4.2 Commercial viability

The materials employed in the Deltherm unit are inexpensive and easily obtained. There are no rare minerals or unusual manufacturing processes in-

volved. The major problem will be the education of the potential user. The concepts of infrared heating will have to be sold. A secondary problem will be designing the installation for most efficient use. This is discussed more fully in Appendix A.

SECTION 5—ENERGY CONSERVING POTENTIAL

5.1 Electric heating versus deltherm

The inventor claims that to raise the ambient air 50°F to 65°F in a 9,000 cubic foot room (30′ x 30′ x 10′) with four changes of air per hour requires 10 kilowatts per hour using present systems. The same may be achieved with personal heaters of DELTHERM for one kilowatt per hour. This claim needs more critical evaluation as it is based on localized heating versus total room heating.

However, energy savings of some sort can be realized over any other form of electric heat (estimated 30–70 percent). The initial costs per installation will be competitive. In those areas of the country where gas companies permit no new customers, Deltherm will offer advantages to all those using electricity for heat. At 5 cents per kilowatt hour Deltherm can compete financially with propane and unregulated gas in many areas. These prices are of course dependent on economic considerations and have varied widely with respect to one another in recent years.

5.2 National considerations

Electricity has the potential for utilizing low grade coal, nuclear energy, hydroelectric power, low grade fuel oils, etc. Essentially the national choice can free us from foreign dependence in home heating if capital is invested in power plant capacity for the fuel of choice. Pollution from energy sources could be controlled at the power plant.

During the severe winter of 1967–1977 when stores and factories curtailed heat usage or closed; individuals achieved personal comfort in small areas with electric heat. Present power plants cannot stand proliferation of this method. Deltherm can curtail the energy required by existing electric heat users to provide energy for expansion up to the level of present plant capacity.

SECTION 6—MARKETPLACE TRANSFER AND POTENTIAL BARRIERS

To be marketed in the United States the Deltherm unit must receive Underwriters Laboratory (UL) approval and be packaged according to their specifications. To be used freely by the construction industry, State and local building code boards must be convinced of the worth and safety of the product. Both of these must be accomplished.

A good choice has been in the range of test sites. They include, existing and being installed, a home, office, food store, simulated army post, apartment unit, industrial plant, and a warehouse. Locations are in Natick, Massachusetts; Washington, D.C. area; Chicago, Illinois; and Sikeston, Missouri (see Appendix D).

Some problems might appear during testing, however, enough operational time has elapsed to predict that they will be limited to minor considerations.

APPENDIX A

INFRARED PHENOMENA

This appendix provides a brief discussion of infrared phenomena. This particular invention is so versatile and unique in its application that some thinking reorientation is in order. Education of the prospective buyer; not pricing, consumer packaging, or feasibility, will be the initial sales problem.

A.1 Concept definition

Sunlight streaming through a closed window heats objects it strikes to a temperature considerably above room temperature. However, the immediately adjacent shadow area is still at room temperature. This additional heat is

provided by the infrared rays of the sunlight. This phenomena will be repeated with Deltherm except the heating rays will be invisible.

A.2 Operation and installation

A.2.1 Infrared operation

Infrared radiation (IR) occupies roughly the wavelengths between 7,800 and 4,000,000 Ainstroms (A). All bodies above absolute zero radiate in this spectrum to some extent and receive similar radiation. In general, IR is rapidly absorbed by water vapor and to some extent carbon dioxide. The bandwidth between 7,800 and 14,000 A is a band of transparency for water vapor. At these wavelengths it will penetrate a large animal (with fur, clothing, etc.) as far as the blood vessels.

The paint ingredients in the subject patents are chosen to produce a radiating center of 13,500 A. Thus, regardless of the ambient humidity, most of the radiant energy transmitted by the panels will arrive at the room surfaces and be utilized, and will be especially efficient on the human body.

A.2.2 Thermal operation

The prototype black model is gloomy and unappealing. This has led to the owners of prototype panels and/or thermal paint to attempt various coverings. These coverings produce a stabilized surface temperature at efficiencies of at least 50 percent over existing tungsten wire and carbon rod heaters. However, they eliminate the unique characteristics of infrared spectrum of the paint.

Infrared radiating pigments are being developed to provide more decorative home panels with the same sort of efficiencies obtained by the black panels. Initially, coverings of semi-transparent Mylar, widely seen in the windows of high-rise curtain-wall buildings to reduce solar heating, may be used. The resultant colored panels would have 30–40 percent inefficiencies in infrared transmission. However, this will be converted to localized air heating thus reducing the overall energy inefficiency.

A.2.3 Installation and measurement

The installation design of Deltherm must be carefully tailored to both the space and the activity taking place therein. "Hotspots" must be eliminated and "coldspots" allowed only when it does not affect the activity or the contents of the space. Consideration must be given to the use of high wattage overhead units or low wattage wall panels. Color coordination will reduce efficiency somewhat and must be accounted for. These requirements will probably entail the development of a new approach to HVAC.

In addition, a new "comfort" measuring device will be required. In order to determine standards for design, an instrument that can evaluate the comfort from a combination of temperatures and infrared must be available. Temperature readings only will give an invalid determination.

A.3 Special applications

A.3.1 Uniform heating

The ability to provide stabilized extremely uniform heating in any shaped container will find applications in delicate chemical reactions and bacterial culturization. This may lead to even more controlled operations with cheaper energy inputs.

A.3.2 Spot uses

Warming batteries in winter, oil sumps, airplane wings (deicing) and similar spot uses may be made extremely simple by the application of electrically connected strips, or blankets formed of sandwiched Mylar or any suitable material. The units may be made at low or high wattage and stored folded or rolled in any convenient area.

A.3.3 Sealed areas

Stabilized warmth can be provided in sealed rooms. Energy could be reduced 50 percent over any other method for these dust free sterile areas. An example of this would be work with premature infants or those with birth defects. The

radiant panel would keep the baby comfortable (no thermal shock) without excessive room heating. The reverse application would be refrigerated surgery where aimed panels kept the surgeons comfortabl without unduly warming the air and hence the patient.

A.3.4 Island uses

The effect of warming surfaces and humans without warming the air makes island usage practical without undue partitioning. Areas of warehouses, barns, subway stops, and offices could be selectively warmed inexpensively.

A.3.5 Germination

The connection between infrared and germination is strong for exact frequencies for certain seeds. Panel usage in greenhouses could speed germination and shorten the time when gas heat is employed. The greenhouses are maintained warm and humid by employing gas heat in many areas. There is no insulation (i.e., thermopanes). It is believed that ambient air temperatures could be lowered if growth inducing radiations were employed. This has great potential for reducing energy usage. However, additional research is required.

A.3.6 Beams

An area of invisible beams is developing. Interrupted beams find application in signaling and burglar alarms. Fixed beams provide infrared control of industrial processes in both detection of anomalies and exact temperature control by comparison with beam standard. A sample use would be fruit sorting based on selective absorption by ripe fruit.

Strong beams in the 13.5 A region would penetrate fog and cloud cover. This could be used to guide landing aircraft or establish imitation camp sites for watching enemy satellites.

In all these applications, portability and efficient energy conversion to a select frequency are persuasive features.

Appendix B

PRACTICAL APPLICATIONS OF DELTHERM

This appendix presents some of the uses for the subject invention as envisioned by the inventor. These have been reviewed and appear to be reasonable.

Infra-red emitting, heat producing, and electrical conducting applications

1. Spatial radiant heating of all types, and for all uses, indoor and outdoor.
2. Surface heating and heat-transfer applications to air, gases, waste liquids, and solid surfaces within the bounding parameters of the temperature stability of the conductive formulations.
3. Utilization in connection with:

(*a*) Swimming pools, fish aquaria, ponds and lagoons, water troughs and other bodies of water.

(*b*) Clear-top stoves, hot-table food serving, hot plates, and beverage warmers.

(*c*) Industrial ovens for drying, baking, or shrinking.

(*d*) Engine and battery heaters to prevent congealing of lubricating oil and maintaining batteries at optimum temperature efficiency.

(*e*) Aircraft wing de-icing.

(*f*) Cargo space temperature control in aircraft, trucks, vans, containers, ship holds, railway cars, and buildings.

(*g*) Roadway, driveways, stairs, bridges, walkways, roofing, piping, pipelines, storage tanks, and vessel snow-control and de-icing.

(*h*) Control of barnacles, algae, and other forms of marine growths on ships and aquatic marine structures, including intake watercooling pipes for nuclear and conventional plants.

(*i*) Terrestrial, marine, submarine and aerial signalling and navigation devices, such as aircraft landing approach homing displays and controls.

(*j*) Voltage transformers and battery chargers.

(*k*) Wireless sheet conductors for illumination displays, light bulb contacts, visual control boards, decorative panels and electrical and electronic circuitry.

(*l*) Electrical and electrostatic discharge and grounding (antistatic coatings).

(*m*) Electrostatically sprayed paints and electroplated metallic coatings.

(*n*) Cosmetology, hair dryers, electrically heated rollers.

APPENDIX C

The first part of Appendix C consists of a letter from Shefferman & Bigelson Company, Consulting Engineers. They analyze the Thermal Ventures warehouse arrangement and predict energy savings of 50 percent. The first page of calculations is based on building heat leakage between an internal temperature of 72°F and external temperature of 10°F. The second page of calculations is heat loss taken with normal degree days for each month to determine an annual consumption for a standard or average year.

The second part of Appendix C is a letter from Thermal Ventures (TV) to the Potomac Electric Power Company (Pepco). This letter explains the conditions of testing prior to the installation of the sealed Pepco monitoring devices. It also sets forth the TV warehouse conditions during the Pepco testing. Relevant operating parameters include: (1) panel continuous operation, (2) temperature at 70° F thermostatically controlled to ±2° F, and (3) warehouse operating normally as a flow area, not a term storage area. The energy savings estimate of 50 percent made by the consulting company was based on the data taken prior to installation of the more sensitive Pepco units. Thermal Ventures continues their monitoring as a parallel effort.

The third part of Appendix C was to be the Pepco data. It is unavailable.

SHEFFERMAN & BIGELSON CO.,
CONSULTING ENGINEERS,
Silver Spring, Md., April 5, 1977.

Re Thermal Ventures Project No. 77030.

Mr. JERRY WOLMAN,
Thermal Ventures, Inc.
11700 Old Columbia Pike,
Silver Spring, Md.

DEAR MR. WOLMAN: We have completed a preliminary review of the low intensity infrared (radiant) heating system, known as Deltherm, which you are demonstrating in the warehouse at 4275 Howard Avenue, Kensington, Maryland. In addition, enclosed you will find the heat loss, annual energy consumption, and annual energy lost computations you requested for said warehouse.

While a firm judgment cannot be made until the detailed results of the ongoing Pepco consumption analysis are available, and until a more thorough compilation of low level infrared background research can be completed, it is safe to assume that the Deltherm system would result in annual fuel savings in excess of 50% over normal electric heating systems. The early Pepco results, while not definite, seem to indicate that the annual fuel savings over the in-place space heating system may be in the neighborhood of 55 to 65 percent. The additional benefits of Deltherm's radiant heat versus forced hot air systems while not quantifiable, cannot be ignored.

With regard to the heat and energy computations, the calculated space heat loss, based on 72° ambient space and 10° outside air temperatures, is 80,866 BTU/Hour or 23.69 KWH. The calculated annual energy consumption for a normal electric heating system in Washington, D.C. is 29,858 KWH. The calculation, as noted in the 1973 ASHRAE Handbook, is by the degree day method based on the averaged U.S. Weather Bureau mean temperature recordings for the period 1931 to 1960 inclusive. Thus the calculated energy consumption of 29,858 KWH is based on this 29 year average and does not reflect the severe climatic conditions that were experienced this past winter.

The calculated annual energy cost is $1,434.37 based on the above mentioned calculation method and $0.048 per KWH including demand, fuel cost adjustments, energy taxes, sales taxes and environmental surcharges.

We will update and finalize our findings upon receipt of a copy of the Pepco report on the consumption analysis now under way to confirm the overall energy savings of the Deltherm heating system over normal electric heating systems.

Should you have any questions regarding this matter, please do not hesitate to contact us.

Very truly yours,

SHEFFERMAN & BIGELSON CO.,
S. M. SHEFFERMAN, *President.*

Enclosure.

4275 HOWARD AVE. WAREHOUSE—HEAT LOSS CALCULATION

[Basic data: Inside temperature 72°; outside temperature 10°; DT 62°]

Heat loss	Btu per hour
Wall: 145 ft²×0.33U×62°DT	2,967
Overhead door: 144 ft²×1.17U×62°DT	10,446
Door and transom: 36 ft²×0.46U×62°DT	1,027
Floor: 2,325 ft²×0.05U×12°DT	1,395
Floor perimeter: 25 lf×0.60U×62°DT	930
Subtotal	16,765
Infiltration (½-in crack):	
(a) Overhead door: 12 ft×12 ft; 12+12+12+12 (48 lf). Loss: 48 l f.×19.2cfm/lf×1.08×62°DT	61,710
(b) Entrance door: 3 ft×7 ft; crack: 7+7+3+3 (20 lf). Loss: 201 f×1.8cfm/lf×1.08×62°DT	2,411
Total heat loss	80,886

ANNUAL ENERGY CONSUMPTION AND ENERGY COST—MONTH BY MONTH ENERGY CONSUMPTION COMPUTATION

[Basic data: Heat loss 80,866 Btu/hr or 23.69 kWh; electricity cost 3¢ kWh]

Month	Heat loss (kilowatt hours)	Degree ×days	×Constant	Degrees ÷DT	Monthly= kilowatt hours
January	23.69	871	18.5	62	6,157
February	23.69	762	18.5	62	5,386
March	23.69	626	18.5	62	4,425
April	23.69	288	18.5	62	2,036
May	23.69	74	18.5	62	523
June	23.69	0	18.5	62	0
July	23.69	0	18.5	62	0
August	23.69	0	18.5	62	0
September	23.69	33	18.5	62	233
October	23.69	217	18.5	62	1,534
November	23.69	519	18.5	62	3,669
December	23.69	834	18.5	62	5,895
Total annual consumption					29,858
Annual energy cost (29,858 kWh×$0.048)					$1,434.37

THERMAL VENTURES, INC.,
Silver Spring, Md., March 29, 1977.

JACK STEVENSON,
Manager of Energy Services Department,
Potomac Electric Power Co.,
Washington, D.C.

DEAR JACK: We want you to know how much we appreciate the time you are taking on our project. We are hopeful that when the tests are completed that you will share our enthusiasm.

A Pepco representative read the meter today and changed the magnetic tape. Therefore, I am enclosing the reports that had been logged since March 7, 1977 and I am requesting by a copy of this letter that Dr. Ellis sends you any additional information that he has logged.

For clarification I would like to make you aware of the following facts.

1. The panels have never been thermostatically controlled.
2. The panels have been operating 24 hours a day, 7 days a week, with the exception from time to time we have cut off as many as four panels when the temperature went above 72 degrees.
3. On March 30, 1977 we will put the thermostat into operation on a 70 degree reading.
4. The ten panels are approximately 8,000 watts versus 30,000 watts that was originally required for the heating of the warehouse.
5. The panels have been able to maintain an even temperature within two degrees, at any part of the warehouse, which would have been impossible with the original heating system.

6. There is no dryness in the air using the panels, as there had been with the original heating system.

7. If the ten panels were on 24 hours a day, 7 days a week, 30 days a month, according to the figures you furnished to me, it would require approximately $172.00 worth of electricity.

8. If the original heaters were on 24 hours a day, 7 days a week, 30 days a month, according to the figures you furnished me it would require approximately $648.00 worth of electricity.

We are both aware that under normal conditions the original heaters would not run 24 hours a day, nor would the panels, so consequently the amount of electricity required in either case would be proportionately lower.

I am hopeful that after your readings of the magnetic tape that you will be able to confirm to me that the above information is correct.

Once again, many thanks.

Sincerely,

THERMAL VENTURES, INC.
By JERRY WOLMAN.

Enclosure.

APPENDIX D

PLANNING AND FUNDING

(NOTE.—Planning and funding information was requested from the inventor. The following information was received and has been reviewed. The planning appears adequate and the funding, while not evaluated item by item, is within reason except perhaps the 25 percent G&A.)

A. Objectives

1. Submittal of pre-production models (prototypes) of 2′ x 4′ and 4′ x 8′ Deltherm panels to Maryland Electrical Testing Laboratories (MET) for evaluation and listing.

(*a*) Production of uniform pigments.

(*b*) Fabrication and testing of panels.

2. Development of final Manufacturing Methods for automated coating, laminating, and assembly of the thermogenic film and accessories, including quality control methods and standards.

(*a*) Design and fabrication of "burn-in" test stand.

(*b*) Installation of material screening, quality control, and final assembly capabilities for prototype production.

3. Promulgation of additional full-scale demonstration programs for accumulating engineering evaluation data:

(*a*) Cold-room tests (U.S. Army, Natick, Mass. Laboratories), with instrumented copper dummies (Summer, 1977).

(*b*) Full 1977–78 Winter season evaluation tests, as Kensington, Maryland, warehouse site, comparing power consumption under similar conditions with hot air convective heating, sponsored by Potomac Electric Power Company (Pepco), in order to determine minimum power requirements for radiant comfort heating.

(*c*) Installation of Deltherm panels in a commercial office, a single-family home, and in an apartment—all in the Washington, D.C. area.

(*d*) Test installations, under controlled conditions, fully instrumented and monitored, in Chicago, Illinois, under the supervision of Commonwealth Edison Company, and also in an industrial plant (National Lock Company, Sikeston, Missouri). Additional test installations for interested food-store chains and other commercial store enterprises.

4. Accumulation of life data and reliability data under normal and accelerated aging.

5. Commercialization and Marketing Activities.

(*a*) Preparation of illustrated brochures, installation instruction manuals, and Standard Specification descriptions for Sweet's and other catalogs.

(*b*) Preparation of Engineering Handbook for construction code authority approvals in different areas of the United States.

(*c*) Preparation of publicity releases, Architect/Engineer seminars, media conferences, etc.

6. Engineering analyses and model development of applications for Deltherm products.

It is anticipated that foregoing items 1 through 5 will be carried out in 1977 and the winter of 1977–78, while item 6 will be a continuing ongoing activity.

For the present, it is Delphic's intention to control the prototype manufacture of the Deltherm paint in its Miami facility, and to subcontract only the coating of the "Mylar" film, the laminating of the films, and the printing, and the laminating of the aluminum foil backing. Delphic will perform all qualitiy-control testing, the assembly and the finishing of the panels with attachments (plugs, wiring, etc.), the final checkout ("burn-in"), and the packaging and shipping of the product itself.

A brief breakdown of the estimated costs associated with the above activities:

I. Production and quality control equipment:	
1. 25 in wide roll and doctor-blade coater, with drying tunnel, takeup reels, and fingers for applying foil, busbar	$12,000
2. 24 by 36 in silk screen printer, with frames, and replacement fabrics	6,500
3. AGA Thermovision infrared scanner (for measuring surface temperatures and detecting hot spots in panels under test)	18,000
4. Various paint-testing equipment (drawdown rods, thickness gages, abrasion tester, flex tester, tensile tester, et cetera)	6,000
5. Fluke high sensitivity digital multimeter with amperage shunts	2,800
6. WAHL Heat Spy (3), infrared thermometers (handheld, portable)	4,800
7. Custom-designed burn-in test stand for 24 panels (expandable in multiples of 12)	10,000
8. Panel-curing oven (hot air)	6,000
9. Thermocouples and multipoint recorders (2)	4,700
II. MET and UL submission requirements	8,000
III. Final assembly facilities:	
1. Jigs and fixtures	4,000
2. Conveyor and tables	3,500
3. Pneumatic crimper and tools	1,800
4. Storage racks	2,600
IV. Demonstration test programs (as listed above):	
1. Technical support personnel (1 man-year)	22,000
2. Materials and fabrication	12,000
3. Installation costs	14,000
V. Consultation services—professional	12,000
VI. Travel and per diem (to demonstration site, promotional efforts, trade shows, MET/UL labs, etc.)	20,000
Subtotal of costs	171,200
Add general and administrative at 25 percent	42,800
Prototype commercialization (estimated requirement total)	214,000

AIR TRANSPORT ASSOCIATION OF AMERICA,
Washington, D.C., September 19, 1977.

Hon. RUSSELL B. LONG,
Chairman, Committee on Finance,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: As the Senate Finance Committee continues its deliberations on tax proposals for the national energy program, I thought it would be useful to you to have information on the effect of the crude oil equalization tax on airline costs. Fuel now accounts for about 20 percent of airline operating costs, compared with 12 percent just three years ago.

By 1980, when the crude oil equalization tax would take full effect, it is expected to amount to 6–8 cents per gallon of crude oil. If the tax is not passed through proportionally to all petroleum products, the price of jet fuel, for example, could bear a disproportionate burden, resulting in a tax impact by 1980 of 8–10 cents per gallon. Accordingly, the airlines hope that appropriate mechanisms will be provided to preclude this possibility from occurring. Such action would

be consistent with the amendments to Section 4(b)(2) of the Energy Petroleum Allocation Act (EPAA), which insured that users of jet fuel sustained no more than a proportional share of increased crude oil costs.

To put equalization tax increases into perspective, a rise of 6–8 cents would amount to $600 million to $800 million for the airline industry by 1980; an increase of 8–10 cents would total $800 million to $1 billion. By way of comparison, the profits for the airline industry in 1976, including $112 million in debentures, amounted to $563 million. The expectation is that the profit level this year will approximate the 1976 total. Thus, the proposed tax could amount to almost double the annual profits of the entire industry.

The purpose of the equalization tax is to encourage conservation of petroleum fuel through higher prices. Higher energy prices may well promote greater fuel conservation and improved energy efficiency. But higher prices will also produce the need for increased airline fares. This is so because the high ratio of fuel costs to total airline operating costs will go even higher under the energy plan and the expected increases in the cost of crude oil from which jet fuel is made.

Higher transportation fares necessitated by higher fuel costs thus would tend to discourage the shift from private to public transportation, contrary to the overall energy conservation goal. It might be useful, therefore, if the Committee were to explore ways to minimize the need for higher public transportation fares as a result of higher fuel costs, and consider, for example, the possibility of an exemption from, or refund of, the equalization tax on fuel used by common carriers.

It is also important to note the effect of a large new tax burden on airline industry capital investment needs. During the decade of the 1980's, the airlines must invest $60 billion in order to reequip their fleets for modernization and to meet anticipated growth in the demand for air transportation. This contrasts with some $15 billion that will have been invested in the 1970's. Investment funds of this magnitude can be generated only if the airlines are profitable enough, after taxes, to sustain the confidence of the investment community. Heavy additional taxes on jet fuel will compound the airlines' financial problems and deter capital formation efforts.

Higher fuel prices cannot force the airlines to shift to alternative fuels because there is no alternative to jet fuel. Airline conservation measures will be achieved largely through replacement of older equipment with newer aircraft which will be as much as 25 percent more fuel efficient.

The House version of the crude oil equalization tax gives special recognition to the problems of home heating oil users and users of propane by relieving them of the burden of the tax. A strong case, we believe, can be made for a similar exemption for all forms of public transportation, since the proposed tax will lead to higher costs for users of the public transportation systems and, in the case of the airlines, to extended use of less fuel-efficient aircraft.

The airlines have done an effective job in reducing energy consumption; in 1976, for example, the airlines used 800 million fewer gallons of jet fuel than in 1973, whiel carrying 21 million more passengers and more cargo. These conservation efforts will continue, particularly as a result of replacement of less fuel-efficient aircraft.

I hope this information is useful to you and that it will be made a part of the Committee's hearing record.

Sincerely,

PAUL R. IGNATIUS,
President and Chief Executive Officer.

NORANDEX, INC.,
Cleveland, Ohio, September 14, 1977.

Subject: Support of House version bill H.R. 8444

THE SENATE FINANCE COMMITTEE,
Staff Director,
Dirksen Senate Office Building,
Washington, D.C.
(Attention: Mr. Michael Stern).

DEAR MR. STERN: We are not including supportive data as a part of this letter of intent to support House bill H.R. 8444. We would like to go on record in support and explain that for the past four years, we have expensively redesigned

our building material product line (i.e. thermally improved windows and siding) in keeping with the suggestions of two administrations to produce energy conserving products.

We solely manufacture these products and distribute them through a vast company-owned distribution network. With this network of distribution, we are completely aware of the desire by homeowners to include energy conserving improvements consistent with the suggestions of these two administrations.

We again repeat for the record our recommendations for eligible energy saving home improvements tax credits.

Revenue gain at the expense of a tax credit for energy savings simply does not add up to administrative requests and suggestions.

Very truly yours,

JACK RAINEY,
Director, Product Management.

STATEMENT OF EDWARD G. JORDAN, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, CONSOLIDATED RAIL CORPORATION, PHILADELPHIA, PA.

Mr. Chairman and members of the committee, my name is Edward G. Jordan and I am Chairman and Chief Executive Officer of Conrail.

As you know, Conrail commenced operations on April 1, 1976 pursuant to the Regional Rail Reorganization Act of 1973, as amended. Conrail was created as a private railroad out of portions of six bankrupt railroads in the northeastern and midwestern United States. Conrail serves a 17-State area over a 17,000 mile system with about 34,000 miles of track, about 5,000 locomotives, and a fleet of over 150,000 cars. In 1976, Conrail hauled over 82.1 million tons of coal to make it one of the largest coal-carrying railroads in the United States.

I appear before the committee today to support the broadening of the alternative investment tax credit provisions in Section 2061 of H.R. 8444 to include a refundable investment tax credit for current investments in equipment and facilities used for the transportation of coal. It is our position that the transportation of coal by railroads is an essential, efficient and vital component of the goal of substantially increasing the use of coal as a plentiful energy source, and that railroads through an additional tax credit with a refundable feature, can expedite their ability to handle the nation's increased coal demands over the coming years.

The strong reliance which the President's energy program places on coal development and utilization will require investments in lines and improved tracks to serve coal mining facilities. Additional investments in hopper cars and the equipment necessary to move coal will also be required. More importantly, railroads will need to spend billions of dollars to expand and upgrade all tracks and yards and to maintain improved lines and equipment if they are to match coal supply and demand efficiently. These efforts will require immense capital investments by many railroads.

While the railroad industry has repeatedly shown that it can meet the demands of increased coal usage, consideration should be given to the costs and funding sources for the capital which will be devoted to the projects I have described. Many railroads, because of the historic inability of the industry to generate capital, have heavy debt burdens, and little or no access to the capital markets. As a result, they are often forced to meet capital needs through internal cash flow, thereby limiting their ability to accomplish needed system rehabilitation or equipment acquisition as quickly as they would prefer.

Railroads have also resorted increasingly to the acquisition of equipment by leasing. While leasing permits use of the investment tax credit by the lessor, and thus some benefit is passed to the lessee railroads, the railroad continues to pay more for its equipment than it would if it were in a position to acquire the property by purchase, and obtain full use of the credit.

In short, Mr. Chairman, railroads are the basic mode for transporting coal. To the extent that they can increase their coal-hauling capacity on a crash basis, coal can more quickly become the primary fuel on which American industry and electric power relies, and our need for petroleum can be reduced. Appropriate tax recovery will expand ability of railroads to effect these increases as quickly as possible.

Many railroads would be able to utilize an additional 10 percent Investment Tax Credit to reduce the cost of acquiring new equipment and improving or constructing new facilities for transporting coal. However, a number of railroads,

while not in a tax-paying position, provide essential coal transportation services which will be needed to serve increased coal production and use. Conrail is a specific example of a railroad with massive capital needs for which any Investment Tax Credit, as presently structured, provides only a small, indirect benefit in connection with leased equipment. Over the next ten years, Conrail is committed to a rehabilitation program which will involve expenditures of over $7 billion. Under the Regional Rail Act, the United States Government will invest $2.1 billion in Conrail to assist this rehabilitation program and help offset initial operating losses. This investment must be repaid, with interest. The bulk of the funds needed for this program, however, must come from Conrail's internally generated cash, with some private equipment financing.

To the extent that increased coal usage at the levels proposed by the President, and more sophisticated technology for efficiently handling greater volumes of coal, require capital investments even higher than those now projected for Conrail, we will, like other railroads and companies with restricted access to credit and equity markets, be severely disadvantaged and will be hampered in our ability to achieve all the growth available to us. Conrail needs this kind of growth in its effort to prove that rail service in the Northeast and Midwest can be provided on a profitable basis.

Pursuant to tax legislation enacted in 1976, Conrail succeeded to the tax basis of the bankrupt railroads as to property conveyed to it. This fact, coupled with depreciation of our massive investment in track and equipment rehabilitation and our initial operating losses, means that Conrail would not be in a position to utilize the additional Investment Tax Credit in H.R. 8444, even if it were broadend to include coal transportation investments. This result will occur even though Conrail will be making significant investments in coal hauling equipment and in improving lines essential to coal train operations. In 1976, Conrail's general rehabilitation program generated over $271.6 million in investments subject to the existing Investment Tax Credit.

Conrail's future plans project even more substantial coal related investments. So long as demand increases, Conrail now plans to purchase over 3,000 new coal hopper cars, at an estimated cost of $100 million. To haul these cars, Conrail plans purchases of 100 locomotives at a cost of $60 million. A refundable Investment Tax Credit related to these coal-transporation equipment purchases would thus clearly be of considerable assistance in expenditing our programs.

Conrail and other railroads which are trying to return to profitability have embarked on significant capital programs in spite of their present financial condition. These companies are trying to improve efficiency, cut costs, and increase traffic. The additional Investment Tax Credit in H.R. 8444 was designed specifically to encourage the greater industrial use of coal, yet it is unavailable to these railroads, or to profitable roads, all of which could use it to join coal supply and demand quickly and inexpensively. A refundable credit would provide an energy incentive to every coal hauling railroad in the Nation, and restore some fairness to the Investment Tax Credit as a capital formation-energy conservation tool.

I want to emphasize that, while Conrail and other railroads are eligible for various types of Federal investments under the Regional Rail Reorganization Act and the Rail Revitalization and Regulatory Reform Act of 1976, the funds in those Acts are available only as an investment and must be repaid by the borrowing railroad, with interest. These funds will help to meet some of the capital needs of many railroads, but the total need, including the immediate demand for increased coal-handling capacity, will be far greater than the amounts provided for Conrail or other railroads.

If railroads are to have the capacity to provide the kind of service that the Nation will demand of them in the crucial period ahead, they should be able to participate in the indirect investment in coal-use projects which the Government proposes to make in H.R. 8444. Applying the additional credit to coal transportation equipment and facilities, and making it refundable, will accomplish that objective.

STATEMENT OF THE NATIONAL ASSOCIATION OF MANUFACTURERS

OVERVIEW

The tax provisions of H.R. 8444, "The National Energy Act", as passed by the House, appear to be the foundation of the Administration's proposed national

energy plan. Their potential for comprising a comprehensive and effective energy program are questionable, but their potential for extracting more revenues for the federal government from the productive private sector is enormous. In fact, the energy program appears to be little more than a series of new taxes and tax credits.

It is the view of the National Association of Manufacturers that the tax system should be a broadly-based structure used primarily for fiscal purposes. Federal tax policy should not impede economic progress and should impose moderate tax burdens. With these fundamental principles for guidance, we conclude that tax provisions of H.R. 8444, particularly the substantial new taxes which would be imposed on oil and natural gas, are not a proper use of the tax law and should not be enacted.

A national energy program should encourage more development and production of both petroleum and alternative energy sources, and it should encourage more efficient use and conservation of scarce and foreign fuels. While mandatory federal rules and regulations can have some impact on conservation, the operation of the marketplace's price structure would result in more significant and long-lasting favorable effects on production and efficient use of energy as well as conservation.

Energy taxes as an energy program

Primary causes of the current energy problem have been the artificially low prices for domestic oil and interstate gas, which have dampened the incentive to produce. Yet the bill seeks to replace these artificial structures with others, namely market prices based on the producer's price plus sizable excise taxes. Following enactment of such proposals, there would be two rather predictable results; first, the consumer would pay more for the same amount of energy and second, the cash raised by the tax differentials would not be used to develop and produce additional energy sources.

There are more realistic approaches to stimulating such development and production. For instance, changes in methods of capital recovery to allow for rapid deductions of capital expenditures would stimulate both investment in energy development as well as investment by industry in modern, more energy-efficient assets. Removing present restrictions which maintain artificially low prices would spur both conservation by energy users and increased exploration and production by energy producers. Diverting the funds which would be collected as taxes back into new exploration and development would do more to increase supply than rebates or retaining the revenues in the Treasury.

Excise tax on use of oil and gas

While higher interstate gas prices would raise industry's costs, it is our view that unregulated prices would result in more dependable supplies as well as larger supplies of gas. But the excise tax approach will produce neither result, and it should be abandoned.

This tax proposal would be a negative economic incentive for industrial and utility users of oil and natural gas. In other words, in exchange for conversion to coal or other fuels, firms would not be hit with this penalty tax. The nontax provisions, Part F of H.R. 8444 as passed by the House and S. 977 in the Senate, are designed to require conversion from oil and natural gas to coal or other fuels for existing electric powerplants and major fuel-burning installations. These provisions also prohibit the use of oil or natural gas in new facilities. The Senate and the House, in considering these provisions, recognized that for technical, economic or environmental reasons, certain facilities would be unable to convert to coal and, therefore, provided exemptions from the conversion requirements where sufficient justification exists. These coal conversion provisions in themselves represent an ambitious program to require industrial and utility conversion from the use of oil and natural gas to coal or other fuels.

The excise tax on the use of oil and natural gas is an unnecessary complication in the overall mandatory conversion program. In addition, the tax provisions apply to all industrial and utility uses of natural gas and oil with exemptions provided for certain uses. Exemptions are to be granted by the Secretary of the Treasury and would require the Secretary to make certain findings in each case requesting such exemption. The intention to exempt certain types of nonindustrial consumers and industrial concerns who cannot use other fuels is not consistent with the mandatory conversion provisions. The application of an excise tax on the use of oil and natural gas, which is designed to induce conversion to coal, can only result in a higher cost of production of goods and services when

applied to facilities which cannot convert because of technical, economic or environmental factors.

In light of the Senate and House passed coal conversion programs, the excise tax on the industrial use of oil and natural gas is an unnecessary complication in the program for achieving conversion to coal use. If a tax of this type is enacted, it should be consistent with the coal conversion provisions and the determinations that the Secretary of Energy must make under these provisions. Therefore, an inclusive list should be established which specifies the types of users which are covered by the users tax, consistent with the affected facilities as defined in the coal conversion provisions.

Crude oil equalization tax

A second proposal which would create some problems for industry is the crude oil equalization tax (COET). As in the case of gas prices, industry believes that market prices for domestic oil are desirable even if fuel costs are forced higher. Artificially low prices have long been recognized by industry as a severe restraint to development of domestic oil supplies. However, the artificial increase through COET would not address the supply problem at all and may create new problems as well.

First, the difference between the presently low, controlled price and the higher world price would not go to energy producers to fund new exploration and production. Thus, it would merely raise the price without increasing supply. Second, if enacted with the excise tax on business use of oil, the equalization tax would raise the price of domestic oil above the world price paid by foreign firms. This would create a competitive disadvantage for American industries whose products compete in overseas markets and possibly even cause problems in the U.S. where imports are a competitive threat.

This tax would be strictly a revenue raiser, not a constructive energy proposal. No conservation effect would be felt if the impact of the tax is passed on through the taxpaying business to the consumer and the consumer receives a crude oil tax rebate. By rebating the proceeds of the tax to the consumers, no stimulus is provided to increase supplies of new energy. Therefore, the tax should not be enacted. If eancted, a mechanism should be added which would direct what would otherwise be tax revenues toward new and more efficient production and recovery of existing sources.

Conclusion

These energy tax proposals implicitly recognize that artificially low energy prices are not economically sound. Both the user tax and COET would move oil and gas prices to higher levels, tied to an estimate of true market prices.

But replacing one artificial price with another does not solve the problem. There would be no increase in the price incentive to producers to develop new energy resources. The proposed taxes should be dropped and replaced by removing current restraints on fuel prices. If enacted in some form, the user tax should be written to apply only to those facilities covered by the nontax mandatory conversion portions of the national energy program.

Statement of Abraham Eisenman

Another look at Carter's energy program

On April 20, 1977, President Jimmy Carter stirred the nation with his call for a new energy program with a new energy department to be part of his Cabinet. He called on the nation to face the energy crisis with "the moral equivalent of war."

His program, which was rather hastily put together in about ninety days, won about 90 percent approval from the House of Representatives, with long and historical debates on all aspects of it: Coal, nuclear power, solar power, geo-thermal power, additional taxes and regulation of intra-state natural gas prices.

But, his energy program has run into a buzz-saw in the Senate as I predicted it would in my article of May 1, 1977, published in the Savannah News-Press. The Senate has, after a long filibuster, voted for deregulation of natural gas prices. It has chopped up his energy program so much that Senator Abe Ribicoff of Connecticut has suggested that President Carter come up with a new energy program.

In the meantime, a "funny thing" has happened. Because of the economic recession in Western Europe and the new gas flowing from Alaska and Mexico,

there is, for the present, not only enough gasoline, but prices have been held in check. For the short range period, it seems we have "all the gasoline we need."

Meanwhile, the President did get approval from Congress to buy and store a billion gallons of gasoline for emergency contingencies.

Now, the committees of the House and the Senate supposedly will meet to effect compromises on the energy program that President Carter has proposed.

But, both President Carter's energy proposals and the Congress' will raise energy prices—the Senate wanting to go higher than the President on natural gas. It is strange that everybody has bought the concept that energy prices must go higher when it is obvious now that:

1—There is more fossil fuel available on the short run;

2—More and more people can't afford to pay higher prices for energy.

I am one of the few persons calling for a reduction in energy costs.

I proposed two ways of achieving this reduction quickly:

1—We meet with the OPEC nations and agree to reduce our agricultural and manufactured products 25 percent if they will reduce the cost of a barrel of oil to $7.50 (the WE includes Western Europe and Japan).

Why would OPEC agree to do this? For these reasons:

A—When they raised the price of a barrel of oil from $2.50 to $12.50 and more they caused great suffering and starvation in the third world;

B—They have set off a chain reaction of inflation that now sees thousands of bankruptcies in Japan, economic recession in Western Europe, great suffering and possible economic recession in the United States;

C—If their best customers have economic recessions, the OPEC nations will suffer too, their accumulated billions will have less value, and they could be subject to revolutionary pressures.

D—Oil only costs them about 20 cents a barrel to produce.

If this economic agreement is obtained with OPEC, we could then begin the whole process of reducing inflation by reducing all service-costs 25 percent, with wages over $10,000 reduced 10 percent.

Then, we would all be on a sounder financial basis.

The other path that we must follow is True Conservation.

This involves cogeneration of power by industry (utilizing waste heat to produce more electricity). Sweden and West Germany now get 25 percent of their electrical power this way. We only utilize it for 4 percent.

There are 49 thousand dams in the Nation. They should be utilized for their nearby cities and towns to get hydro-electric power, which is much cheaper than oil or coal produced electricity.

55 mile per hour speed limit enforced for cars. Trucks and buses allowed to go 60.

By 1982, no car can be manufactured that doesn't get at least 25 miles per gallon. Sweden now has such a law.

Where possible, industries, schools, governmental agencies go on a 4-day work basis.

Fiat has produced a 49 horse-power engine run on coal and methane, which heats Italian homes, ties into electric lines and feeds power to the generating plant for which the people are paid, thus getting their homes heated at little cost. We must analyze the use of on site heating units. Fully 50 percent of cost of electricity and natural gas prices is involved in the transportation of electricity and natural gas.

Insulation, mass transit, car-sharing—all the many known technologies of conservation must be utilized.

The nearly 4 million retail operations should cut their hours of operation by 20 percent.

Massive recycling should be utilized.

If all these conservation efforts were pursued we could reduce our oil imports 50 percent and more, keep our balance of payment debt from further depleting our treasury, and avoid OPEC nations cornering the wealth of the world.

Will we do this?

Hardly. Not only has the true inspiration not come from President Jimmy Carter and his energy cabinet, but only lip-service to this pious cause. And Congress seems intent on raising energy prices even higher.

Why won't we reduce our use of oil and natural gas 40 percent and more if it is such a sensible and patriotic thing to do?

Figure it out—if we reduce our use of gasoline and oil by 40 percent, the Federal Government and the States will lose 40 percent of their taxes on gasoline and oil. So the political incentive is really not there.

What about nuclear power? It has been fought so hard by environmentalists and others that the cost of building more nuclear plants has risen astronomically. We now have about 65 nuclear plants and what to do with their present radioactive wastes, which last 25 thousand years has become a great problem.

What about solar power? It's coming—but less than $500 million has been appropriated for its research and development. We must have photovoltaic cells mass manufactured as cheaply as transistors. Big national companies are getting into the solar power field, and thousands of individuals across the Country are utilizing it in their specially built homes. But, it still remains somewhat the energy of the future, even as the use of alcohol from grains, woods, trees and plants, and bio-mass remain somewhat the energy producers of the future.

Alaska—our last frontier will now provide approximately 2 million barrels of oil a day, and when the new natural gas pipeline is built will also provide much new natural gas.

Senator Talmadge recently told me he is in favor of subsidizing fuel from shale in the West rather than having us spend billions importing oil from OPEC nations. China leads the world in geothermal production and production of energy from bio-mass—because it has to.

So, Senator Ribicoff is right—we need rethinking on the energy problems—and we need to think in terms of conservation and reduction of energy costs not increasing them. I believe I have shown how we can do this.

CBS-TV revealed October 6th that Secretary of Energy Schlesinger has agreed with the International Consumers of oil that we must cut our oil imports by 20 percent by 1985.

I propose that we cut it now by 20 percent for these reasons:

1—To cut down on our terrible balance of trade deficit;

2—To force conservation;

3—To stimulate domestic production and to encourage alternative sources of energy.

4—To help bring oil prices down.

If one, unfortunately, has his head in the Lion's mouth, and does not have the common sense to pull it out at once, he will have no head.

I wish to warn in the strongest terms I can conjure that—

The American people can not afford higher energy prices—they can't afford the increases inherent in President Carter's proposed program, and they certainly can not afford the costs involved if fossil fuel prices are deregulated.

I have followed the energy debate daily in the Congressional Record since April 20, 1977, and certain fallacies appeared to me at once:

1—We can not return to the coal age in this nuclear and solar power age;

2—We can not ignore the need to utilize our 49 thousand dams for hydroelectric power;

3—The 65 nuclear powerplants we have now are all we should try to build because of high costs, danger to the environment, and no sane way to dispose of atomic wastes which remain radio-active so many thousands of years.

4—Not enough money has been appropriated for solar power research and development;

5—Contradictory as it may seem, we can not ignore the great possibilities of nuclear fusion power;

6—The opponents of President Carter's energy program claimed that deregulation could get enough oil and gas produced domestically to take care of our needs—but they did not realistically assess the capability of the American people to pay higher energy prices.

Inflation is destroying our economy and that of the world, and yet those in power want to raise the cost of energy.

Oil must come down to $7.50 per barrel, coal to $12.50 per ton, uranium to $30 a pound. Then we can begin to solve our inflationary problems.

[From the Savannah Morning News Savannah Evening Press, May 1, 1977]

ENERGY: GIVE CARTER CREDIT, BUT . . .

(By Abram Eisenman)

(Editors note: Mr. Eisenman, a Savannahian, has been an independent candidate for President of the United States and has written two books on why he

should occupy the highest office. The former radio executive and newspaper publisher in this special article discusses the serious problem of energy).

Now that the Carter administration has announced its energy program, the great debate is on in Congress and in the nation about energy.

The facts that President Carter has presented are indisputable; but the controversy will rage on the best means of getting more energy produced, and conserving energy.

Since President Carter's energy plan represents the Liberal and Conservationists' theories, it would be helpful to get the other side, the conservative viewpoint on energy and compare them.

There is agreement on the fact that fossil fuel energy supplies will be depleted in the near future, and that we should utilize coal to a greater extent because of our vast reserves. There is also agreement on the development of nuclear power plants, a feature of the Carter energy proposal that environmentalists will oppose.

The great unresolved problem is:

Added production of fossil fuel.

The Carter proposals, are a classic example of governmental regulation. Producers ask for deregulation and incentives to explore for more oil and natural gas.

There is also more emphasis placed on the development of solar, geo-thermal and other non-fossil fuel energy producers by the Carter Administration.

One of the weaknesses in the Carter Administration's proposal to put a tax on the bigger cars, the so called "gas guzzlers," is that there are scores of millions of them already owned. And, with the threat of a heavy tax on next year's purchases, several million more will be purchased this year. This may also be a classic example of "locking the barn after the horse has been stolen."

President Carter deserves praise for meeting the energy crisis head on, bringing it out in the open for all to discuss. Congress will debate the issue, with senators and representatives naturally representing the interests of their States. The representatives and senators from Texas, Louisiana and Oklahoma have already served notice that they will fight the imposition of regulation on intra-state natural gas. Senator Edward Kennedy has already put in his opposition to the imposition of additional gasoline taxes as resulting in a hardship for workers and lower income people.

The Republicans in the Senate and House have prepared their own energy plan, which they will soon release. They call for a tax reduction, along with plans generally in line with conservative proposals.

Since Democracy is generally government by consent, which usually follows debate and compromise, it is possible that our new energy program will involve many of President Carter's proposals and some of those by the Republicans and others.

It was rather startling that in his discussion of conservation of energy, President Carter did not call upon the nearly three million retail operations to curtail a certain percentage of their hours. For many have now gone to the 7-day work week, and some have gone to the 24-hour-a-day-and-night operation, which is wasteful of energy and probably not profitable to boot.

Nor was any consideration given to the 4-day work week for some industries, institutions, schools, and governmental agencies. The problem is that all conservation methods are double-edged swords in that when you shorten the work week you presumably shorten employment. It can even be a triple edged sword, if there is such a thing in that millions of workers with a three-day weekend could presumably use up as much gas, if not more, in taking trips, and using their cars more.

President Carter likened the energy battle to a crisis as great as war. The basic difference is that in war, the enemy is visible, tangible, and subject to defeat. Whereas, the energy crisis is involved, long-range, subject to many interpretations and decisions.

Then too, the cynical public asks: If the energy crisis is as dangerous to our country as war, will the President not have to impose severe controls (rationing?) before he really can control the energy crisis?

It makes good publicity to ask high school students to be President Carter's equivalent of Mao's young "red guards"—presumably ours will be "red, white and blue guards." And they could help voluntarily control the waste of energy within their family circles. But, they could hardly control wastes in governmental buildings or even their own schools—as these orders must come from those in charge, who have worked out logical plans with clear cut orders.

Also, and this is rather strange, everyone now accepts higher and higher prices as the normal development for the future. Nobody but nobody has thought of meeting with OPEC to get oil prices reduced to a more equitable $7.50 per barrel, instead of $12.50 or more (it costs them 18 cents a barrel to produce the oil). Obviously, if OPEC reduces oil prices, we will have to reduce manufactured and agricultural prices also. Would that not be better for the entire world? Or, are we to add to the philosophy of scarcity of production, the planned escalation of prices on cars and fuel so that they get out of the reach of the average man?

Mass transit, massive recycling—they are certainly going to be part of our future lives. But, mass transit is hardly adequate in most cities of our nation.

INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE & AGRICULTURAL IMPLEMENT WORKERS OF AMERICA—UAW,
Washington, D.C., September 2, 1977.

Dear Senator: One of the key issues which the Finance Committee will be addressing in the Administration's energy plan is the proposal for a tax on relatively less efficient autos. The UAW believes the so-called "gas guzzler tax" is based on an incorrect assumption that the auto companies will not comply with fleet averages set forth in the Energy Policy and Conservation Act of 1975 and by Transportation Secretary Brock Adams. We therefore oppose the gas guzzler tax, and urge you to consider both the present law and strengthening amendments to that law reported from the Senate Energy Committee before supporting the tax sought by the Administration.

As a matter of background, I think it appropriate to point out that the UAW recognized several years ago the need for tough federal action to improve auto fuel efficiency. The UAW realized that the American automobile industry had unwisely ignored the need to provide American consumers with efficient autos in a wide range of models. Accordingly, we worked actively for passage of the 1975 law which mandate a 100 percent improvement in auto fuel efficiency in a decade, despite the opposition of the auto companies.

The UAW supported the approach of achieving fuel efficiency gains by raising fleet averages for two main reasons:

1. To use the tax mechanism to achieve fuel efficiency gains is to license the right of a small number of wealthier individuals to waste a limited natural resource.

2. By setting fleet averages the auto companies are given an opportunity to market a wide range of models, recognizing that large families might need full size sedans or nine-passenger wagons, but ensuring that total fuel savings are achieved by the offsetting sale of relatively more efficient autos. In this regard, I might note that our involvement in this issue is not based solely on our concern for our members as auto workers, but also on our concern about our members as consumers who may only own a single auto and need a full-sized car on which they cannot afford to pay a costly and unnecessary tax.

In any event, the 1975 law is only now taking effect, with the introduction of 1978 models, and all the information available to the UAW indicates that the auto companies will achieve the mandated fleet averages. I should emphasize that the Secretary of Transportation, in setting the fleet averages for 1981–1984, determined to accelerate the movement to the 1985 standard of 27.5 miles per gallon, and our belief that the fleet averages can and will be attained includes acceptance of the tough stance taken by the Secretary.

Despite all the evidence to indicate that the auto companies will comply with the mandate fleet averages—especially since there are very severe civil fines for non-compliance—the Administration persists in seeking taxes on less efficient autos for the purpose of ensuring compliance. The tax approach troubles us, not only because it is redundant and unnecessary, but because it will mean the imposition of severe taxes on family-sized autos and work a hardship on middle income Americans.

But the UAW has not turned its back on the need to achieve the original goals of improving auto efficiency. On the contrary we have supported as an alternative to the gas guzzler tax an amendment sponsored by Senator Metzenbaum and already approved by the Senate Energy Committee as part of its energy conservation measure. That amendment, which will probably be before the Senate prior to the bill being considered in the Finance Committee, does two things:

1. It establishes minimum mileage standards beginning in the 1980 model year. Under the amendment approved by the Energy Committee no car may be sold in the U.S. in 1980 if it gets less than 16 miles per gallon. The minimum standards rises by a mile per gallon annually, so that by 1985 no car that gets less than 21 miles per gallon may be sold in the U.S. It is our belief that these minimum standards will not work an undue hardship on the auto industry. Also, the use of minimum standards prevents the creation of a situation in which wealthier individuals can pay for the right to waste gasoline in a true gas guzzler. Moreover, by eliminating the less efficient autos from each manufacturer's fleet we enhance the high probability that the fleet averages will be attained. Finally, and quite importantly, such a minimum standard would make the proposed auto tax far less relevant since most of the vehicles whose production is presumed on the tax schedule would not even be produced. For example, the combination of the minimum standard and the House-passed auto tax would mean that in 1983 the tax would only be applied to autos that got between 19 and 20.5 miles per gallon.

2. The amendment also doubles the civil fines in the 1975 law for non-compliance with the fleet standards. Currently the fine is $5 per car for each tenth of a mile that a manufacturer's fleet falls short of the mandated average. To give you and example of what this means, under present law if Ford missed the fleet average in any given year by one mile per gallon it would face a non-tax deductible fine of $150 million, equivalent to $300 million in pre-tax profits. Doubling the fine, as aproved by the Energy Committee, creates such a severe economic disincentive for non-compliance that with its passage there could be no lingering doubt about the fact that the fleet average will be realized.

Unlike the auto companies, which have opposed every Congressional initiative dealing with auto efficiency, the UAW supported the 1975 law and now supports the Metzenbaum amendment to toughen that law in lieu of the tax scheme set forth by the Administration. We are convinced that this is a more equitable approach that makes far better public policy.

We urge you, when the auto tax is before the Finance Committee, to consider all of the foregoing and to oppose the tax as unnecessary and unfair.

Thank you and kind regards.

Sincerely,

HOWARD G. PASTER,
Legislative Director, UAW.

UAW STATEMENT ON TAX ASPECTS OF THE NATIONAL ENERGY PLAN
SEPTEMBER 1, 1977

The UAW has prepared several statements and testimonies on various aspects of the Administration's National Energy Plan (NEP). This statement will be confined to what we see as the central tax aspects of the NEP and of the National Energy Act (NEA) as passed by the House August 5. Those are: the "gas guzzler" tax; the gasoline tax; the wellhead tax on crude oil; and the various tax incentives.

1. GAS GUZZLER TAXES AND REBATES

The UAW opposes the NEP's proposal for gas guzzler and taxes and rebates as harmful to the prospects for meeting our gasoline conservation goals. First, we believe that tax surcharges on fuel-inefficient cars will induce virtually no fuel conservation. We thus concur with the finding of the International Trade Commission (ITC) that the gas guzzler scheme would add nothing to the fuel savings resulting from the fuel efficiency standards set out in the Energy Production and Conservation Act of 1975 (EPCA).

Second we submit that the gas guzzler proposal would actually make it more difficult for manufacturers to satisfy the EPCA standards. EPCA, passed over the opposition of the auto companies but with strong UAW backing, mandates a stringent and progressive upgrading of auto fuel efficiency, and imposes severe penalties on manufacturers which fail to meet the standards.

Under EPCA, consumers will have a choice between a wide range of automobiles of widely different characteristics. Each manufacturer will have to produce and market a fleet of cars whose sales-weighted average fuel efficiency meets or exceeds the EPCA standards. This provides both the incentive and flexibility which the domestic producers require in trying to meet the nation's needs in both

the energy and transportation areas. Finally, the EPCA approach—unlike the gas guzzler tax-and-rebate scheme—does not confer a special advantage on imported car makers whose fleets satisfy by and large only one segment of the U.S. car market.

We ask the members of the Senate to compare the tax approach with the EPCA approach. Where the gas guzzler tax-and-rebate relies on indirect attempts to influence the bar-buying public, the EPCA approach in effect tells the manufacturers: "Conserve or else." Where the gas guzzler tax penalizes the family with only one standard-size car, the EPCA route forces the automakers—who face a wide set of technological and marketing options—to design, build, and sell fuel-efficient fleets.

The UAW's position is that concern about whether manufacturers will comply with EPCA can be met by strengthening that Act, rather than by adding a tax-and-rebate on top of it. While work by J. L. Sweeney of Stanford University provides convincing evidence that the current schedule of EPCA penalties for non-compliance will produce compliance by all U.S. car manufacturers, we have no problem with increasing the EPCA penalties. Thus we support the amendment to EPCA reported out by the Senate Energy and Natural Resources Committee, which would double the fines levied on non-compliant manufacturers. Nor do we object to the minimum miles-per-gallon requirements set out in the same amendment. Those changes are, in our view, preferable to the automobile taxes and rebates proposed in the NEP.

Two final comments on the gas guzzler tax are in order. First, we are concerned that some members of the Senate may want to resurrect the original NEP call for refunds on high-mileage new cars. The UAW opposes such refunds, as we see no way to avoid importers reaping, as it were, windfall sales through rebates paid for by taxes on domestic production. The same ITC study cited above concludes that these rebates would increase imported car penetration of the U.S. market by 300,000 units each year it was in effect. We are convinced that the American public will not accept using revenues from an utterly ineffectual large car tax to encourage greater sales of foreign automobiles.

Second, should a gas guzzler tax be enacted despite what we see as sound reasons for not doing so, the UAW proposes that some or all of the revenues go to finance a scrappage program for the most deteriorated and hence least fuel-efficient care. After all, even in its best years, the auto industry's sales compose only about 8 percent of the cars on the road. We see no reason to take the fuel efficiency of the other 92 percent of the U.S. auto stock as a given: revenues from any gas guzzler tax can be made into conservation revenues by using them to retire the real gas guzzlers of the past 15 years. Under such a federal scrappage program, the government would offer a fixed amount (e.g. $300) for any car turned in. This would remove from operation the worst-performing cars and thus reduce overall fuel consumption. Scrapping those cars would also produce other benefits: overall auto emissions would be reduced; overall auto safety would improve, as the cars turned in would likely be less safe than newer ones; and the problems of abandoned cars would be lessened. The true cost of such a scrappage program would also be reduced by the value of recyclable materials recovered from the cars turned in.

2. GASOLINE TAXES

The UAW continues to oppose the NEP's proposal for a standby gasoline tax. First, it would do little to stimulate conservation. It is too small to significantly affect consumption, given the extremely low short-run price elasticity of gasoline demand. More important, we object to its standby nature. It is naive in the extreme to think that each user of gasoline—whose individual behavior can have virtually no impact on whether or not the tax is triggered—will respond to a not-yet-existing price signal.

Second, the UAW sees increased gasoline taxes as less effective than the wellhead tax on crude oil (see below). We also question both the equity and efficiency of seeking conservation through taxes on users of just one of many constituent parts of a barrel of oil.

Third, we are greatly concerned that revenues from a gasoline tax would not be fully rebated. A recent study by Professor Lester C. Thurow of MIT prepared for the Joint Economic Committee has shown that increased energy prices will, in the absence of full rebates, reduce the real income of the poorest tenth of Americans seven times more than the real income of the richest tenth. Equity thus was

served—and little conservation foregone—when the House defeated proposals for non-contingent gas tax hikes of 4¢ and 5¢ per gallon. It is beside the point that, had a tax increase been voted, some of the revenues would have been used for public transit; we support an effective public transit program, not a mere ad hoc application of revenues from an ill-conceived tax.

3. THE CRUDE OIL EQUALIZATION (WELLHEAD) TAX

The UAW supports the proposal for a wellhead tax and rebate on crude oil, which would progressively increase wholesale petroleum prices toward the 1977 world price, rebating all revenues. The device of a wellhead tax is based on the important distinction between production prices, whose function is to encourage exploration and output while precluding windfall profits, and consumption prices, the role of which is to induce conservation. Consumer demand must be made to respond to marginal price signals, while producers should not receive marginal prices for marginal and non-marginal petroleum alike.

Our support for the crude oil equalization tax, however, is wholly contingent on the progressive rebating of all revenues raised therefrom. The goal of conservation taxes, after all, is conservation; the goal is not to reduce overall living standards or to redistribute income from low-income to high-income Americans.

Our support depends too on being convinced that the wellhead tax-and-rebate approach will remain an enduring element of the nation's long-run petroleum policy. Our concern is that the 1981 expiration date of the equalization tax as voted by the House holds the door open to eventual crude oil and petroleum product price decontrol, to which we are completely opposed. There is no evidence that decontrol would significantly increase exploration or production, and ample evidence that it would lead to huge windfalls to major producers. The extremely high degree of market concentration in the energy sector vitiates the economic theory of the efficiency of marginal cost production pricing. Oil price regulation, supplemented by wellhead tax and rebates, is therefore an absolute necessity.

Nor is the OPEC price a market price in the usual sense of the term; it is a political price which the major oil companies are pleased to transmit. The government should break the OPEC-oil company link and should enter the importation field as a careful bargain-hunter. A greatly increased government role in importation is a key ingredient of a viable long-run national energy policy.

In the shorter run, we are deeply concerned about the future of the associated rebate. In voting only one year of rebates of wellhead tax receipts, the House has left the door open—indeed, held it open—for those who would scrap the rebate in later years, diverting the revenues to such projects as mass transit and general tax relief. This would be a huge mistake; it would amount to funding government programs through an extremely regressive tax. The United States needs a national program for mass transit, and it needs tax reform. It does not, however, need to accomplish these noble ends through the device of an unrelated energy tax.

4. TAX INCENTIVES TO CONSERVATION AND CONVERSION

The NEP relies heavily on tax credits as inducements to conservation of and conversion from scarce fossil fuels. The UAW believes that, for projects as important as those dealt with in the NEP, implementation should be mandated rather than merely induced. Conservation measures taken by commercial, industrial, and residential energy users generally pay for themselves within a few years. As the price of oil and natural gas rises, industrial conversion to coal will also prove to be smart business. Hence, almost all of our energy goals can be realized without resort to credits which reduce government revenues while providing no assurance of effectiveness. Our hope is that the Senate will see fit to scrap many of the NEP's tax gimmicks in favor of strengthening its mandates.

Consider just two of the tax proposals. First, tax credits to residential energy users for expenditures on insulation are non-refundable. A high-income family which spends $2,000 to weatherproof its home would, under the House version of the NEA, be eligible to reduce its tax liability by 20 percent of that amount, or $400. In other words, such a family may install $2,000 worth of insulation for $1,600. Contrast this with the case of a lower-income family whose tax liability is, say, $200. If that family purchases $2,000 worth of insulation, it can reduce its tax liability by only $200. Because the credit is not refundable, those who can least afford to pay higher fuel prices would also be those who could least afford to insulate.

Second, the NEP's proposals for additional 10 percent tax credits for business spending on conservation and cogeneration projects constitute a clear example of the flawed tax gimmick approach. Conservation-related investments will, after a short pay-back period—shortened further by existing legislation allowing accelerated depreciation—provide positive savings to businesses. Why should the government forego revenues merely to induce corporations to do what they already do in response to changing costs and relative prices?

To sum up, we are heartened that a comprehensive energy plan has been drafted by the Administration and presented to the Congress and the public. The NEP's emphasis on conservation is a correct one. Unfortunately, a number of the NEP's specific proposals are neither equitable nor effective means to that laudable goal. The UAW must oppose the NEP's proposals for gas guzzler taxes and rebates, for a standby gasoline tax, and for tax incentives to many conservation- and conversion-related expenditures. We see energy taxes not associated with full rebates as regressive. We support the wellhead tax-and-rebate proposal, and would favor extension of the concept to natural gas pricing as well. But we question the 1981 expiration date of the tax voted by the House, as well as the limitation of wellhead tax rebates to one year. The gas guzzler tax-and-rebate scheme, in our view, is a harmful interference with the eminently sound conservationist logic behind EPCA. Again, we commend the emphasis on conservation of the demand side of the NEP, and are hopeful that sound means to achieve that end can be implemented.

STATEMENT OF W. GIBSON JAWOREK, PH. D., CONSULTING ENERGY ECONOMIST

(Tax Incentives Needed to Evaluate and Demonstrate the Commercial Viability of Production of Oil From Eastern Shales and Other Unconventional Energy Sources)

INTRODUCTION

In assessing the future fuel production potential of the United States, as a response to the now evident national energy problem, the oil and natural gas contained in *shales* of the Eastern states have been consistently overlooked. It has been assumed that this region has solely coal resources, while oil shales are thought to occur exclusively in the Western states.

This has been a serious oversight and reveals, perhaps, that the Congress, the Executive Branch, and the public have been misled in this and other aspects of the future fuel outlook and its impact on economic growth. Needless to say, all domestic fuel sources, producible at reasonable costs, would be preferable to an over-dependence on insecure foreign supplies. However, federal responses to the energy problem—creation of ERDA, for example—have not engendered the right type of incentives to proceed with immediate research and commercialization of oil shale in the West, and have overlooked the potential in the Eastern states. Valuable time has been lost.

The Carter energy plan, stressing conservation of fuel usage and higher taxes on energy consumption, continues the lack of desire to expedite development of domestic fuel resources, particularly new *fossil fuel* sources, as compared to the more exotic energy possibilities exemplified by solar energy.

To reverse this governmental trend of timidity in energy supply innovation, which prevails also in the private sector, it is suggested herein that *direct* and substantial tax incentives be given to those companies and governmental units which will assess and demonstrate new technology for domestic oil and gas supplies such as those known to be contained in Eastern shales.

EASTERN SHALES—WHAT THEY ARE AND WHERE THEY ARE

Crude oil and natural gas are the present remains of a multitude of microplants and microanimals which lived in and around the basins of inland seas throughout geologic history, which spans hundreds of millions of years. As these basins were filled with sediments from rivers flowing from adjoining land areas, the organic remains were enclosed in muds and sands, which were later transformed into shales and sandstones by the pressure and temperatures of succeeding sediments. Over millions of years columns of these sediments accumulated to as much as 20 to 25,000 feet, sometimes more.

Within the earth, organic remnants of animals and plants were transformed by high pressure and temperature into kerogen, a substance containing com-

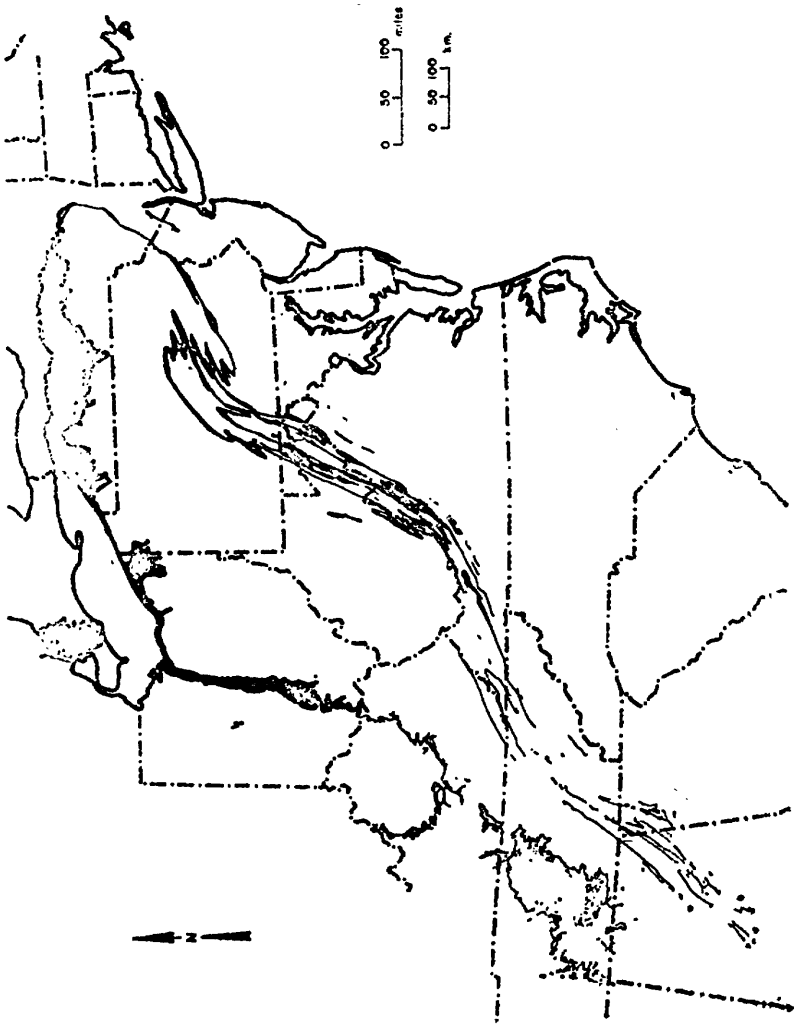
binations of hydrocarbons, which in turn were distilled into crude oil and natural gas. Much of these hydrocarbons traveled through the shales into adjoining sandstones anl limestones and, finally, were trapped by impervious rock barriers. These traps are the sites of present oil and gas fields discovered by drilling.

Importantly, however, a great part of the oil and gas could not leave the originating shales and is still entrapped therein. Subsequent erosion of the earth's surface, over millions of years, has resulted in much of the organic-rich black shales being exposed at or near the present earth's surface. The Eastern shales, for example, underlie large areas of the Appalachian states from New York to Alabama.

The present surface outcrops of shales from the Devonian geologic period (330–380 million years ago) are shown in the following map. The outcrops roughly delineate the Appalachian Basin, an inland sea described previously as ideal for accumulation of oil and natural gas, i.e., hydrocarbons. As this basin became filled with sediments, it became shallow and was finally luxuriant with woody vegetation, which became the source of coal, which is essentially carbon, not hydrocarbons.

In fact, most of the Eastern oil shales are coaly, that is, contain carbon and hydrocarbons, which explains in part why they have been overlooked when compared to the more familiar Western oil shales which are not coaly. For this reason geologic knowledge and research effort on Eastern shales has, until recently, been minimal in comparison to the shales of the West.

OUTCROP OF DEVONIAN SHALE



ERDA'S EASTERN GAS SHALES PROJECT

During the early 1970's geologists in the Appalachian states took renewed interest in the natural gas potential of the Devonian shales, and with strong Congressional support ERDA was instructed to begin a research program on this vast energy source. In 1976 the program was begun and is described in the accompanying brochure.

The current estimate of potential natural gas from Devonian shale is 2,400 trillion cubic feet, of which 10% or 240 Tcf is believed now to be recoverable. This volume would double current U.S. proved reserves.

The ERDA Devonian Gas Shale Program, it should be noted, is focused on improving production techniques to increast output from wells already drilled or to be drilled in the future. These *brown* shales are largely in the interior Appalachian Basin or inside the outcrop map just described.

DEVONIAN BLACK OIL SHALE

Refining oil from black, organic-rich Devonian shales is not new. During the 1860's a company mined and processed "rock oil" from a shale oil plant at Buena Vista, Ohio, on the Ohio River. Oil supplies discovered by "drilling" in Pennsylvania, Ohio, and New York made this plant noneconomic after 1870.

While geologists in the Appalachian states have occasionally noted the oil content of these shales during the past century, no serious evaluations have been undertaken. As a result, geologic data is still scarce and very incomplete. During the postwar period some attention has been given to the uranium content of the shales, which to date has been found to be low-grade, although the vast extent of the shale makes the *potential* uranium reserves considerable. For example, 6 trillion tons of uranium is estimated to be contained in the shale in Eastern Kentucky alone. Thus, uranium could be considered a possible byproduct from a shale oil plant.

The few samples of the Eastern shales analyzed in the past have indicated that about 5 to 10 gallons of oil per ton could be extracted by processing. Western shales average from 25 to 30 gallons per ton.

It is now known that these assays were wrong or at best misleading because the analysis was based on a technique—the Fischer Assay method—which is only applicable to Western shales. In simplest terms, this assay was only recovering the hydrocarbon content of the shale, but not the coaly (carbon) content of the shale.

As a result, an average oil recovery from a sample of Eastern black shale can have 25 to 30 gallons of oil per ton, or be equivalent in liquid volume to the more familiar Western shales. Higher yields, also, have been measured. These findings were the result of laboratory tests conducted by the Institute of Gas Technology (IGT) in Chicago using their "hydroretorting" process.

A quotation from a recent IGT status report will emphasize the importance of this laboratory finding:

"We discovered some time ago, and have confirmed in more extensive testing during the past year, that when we process Eastern Devonian shale with the IGT hydroretorting process, we obtain yields of useful products equivalent to those from conventional retorting of Colorado shale." (Status report on the Development of the IGT Hydroretorting Process for the House Subcommittee on Environment, Energy and Natural Resources; July 12, 1977, by Frank C. Schora.)

On the basis of preliminary sampling of black shale from seven states—West Virginia, Ohio, Kentucky, Tennessee, Alabama, Indiana, and Illinois—IGT estimates that "a new potential resource of 1 billion (1 trillion) barrels of oil is now available." By using the IGT process, an additional 3,400 trillion cubic feet of synthetic natural gas would also be available for extraction, a value higher than now estimated to be contained in Devonian brown shale by ERDA's Eastern Gas Shale Project.

With such a large potential of oil and gas, a major research project to commercialize this resource is strongly indicated.

The IGT hydroretorting process, when applied to Eastern black shales, has a number of distinct advantages, vis-a-vis Western oil shales. They are:

1. Devonian shales are good retorting feedstock, the oil is easily pumped through pipelines, and produces a large distillate yield, i.e., gasoline, jet fuels, and home heating oils—products most easily marketed.

2. The industrial infrastructure already exists in the East to support mining and process operations. Open pit or strip mining is less hazardous to miners.

3. Processing and mining can be carried out in an environmentally accepted manner since areas of shale occurrence are agriculturally and commercially less desirable.

4. Alkaline impurity content of Eastern shales is quite low, less than 1 percent compared to 15 percent in Western shales. The IGT process does not "swell" the shale, thus spent shale disposal is not a serious problem. Spent shale can be used as road fill and aggregate.

5. Uranium and other minerals might be extracted as byproducts from the shale.

6. Process water in the Appalachian Region is ample to support a shale oil industry, unlike the West.

Finally, even if all geological, technological and environmental advantages of Eastern shales, when compared to Western shales, are disregarded, the savings in transportation costs of Eastern shale oil (and gas) to principal fuel markets along the East Coast and the Middle West would be considerable. Numerous interstate crude oil, petroleum product and natural gas pipelines cross the shale outcrop areas and interconnections with Appalachian shale oil and gas production would not be difficult.

In fact, an oil and gas shale industry in the Appalachian states could be a foundation for new industries to locate nearby, providing cheaper and cleaner fuel supplies than available from other regions and foreign countries. However, to begin such an industry, as with most "infant" industries, governmental encouragement, support and tax incentives are a necessity.

THE NEED TO FOCUS ENERGY SUPPLY TOWARD UNCONVENTIONAL OIL AND GAS RESOURCES

Statistics of petroleum supply for the United States in January of 1977 are noteworthy. For the first monthly period domestic production of crude oil was less than 8 million barrels per day, compared to 9.5 million in 1972, before the embargo. Crude oil imports during the same month topped 6 million barrels per day, also for the first time (the quantity was 2.2 million in 1972). Just as important, however, is the fact that U.S. crude oil prices in January 1977 averaged $8.56 per barrel. In 1972 the value was $3.39 per barrel.

Likewise, the creation of ERDA and the vast increase of funds to that agency since 1972 has not produced a significant research development to indicate a breakthrough in increasing oil, gas, or even coal output in the immediate years ahead.

The conclusion is inescapable. Higher domestic crude oil prices have not provided any impetus to retard or reverse the exhaustion of present U.S. oil fields, or even more importantly, significantly induce greater and successful exploration programs to discover new fields.

In a similar manner, government sponsored energy research programs have been plagued with delay, scepticism and, in some instances, failure, as examplified by the recent recognition by ERDA to suspend the so-called Coalcon project to demonstrate new technology to produce liquids from coal.

Still, the nation's unconventional oil and gas resources are known to be immense, enough to last for centuries. These include the following:

Oil Resources	*Gas Resources*
Shale oil—Western	Devonian shale.
Shale oil—Eastern	Western tight sands.
Coal liquids	Methane from coal seams.
Enhanced oil recoveries	Geopressurized water (gulf coast), High BTU from coal (surface) underground coal gasification.

A conclusion can be drawn, and should be. To insure future ample domestic oil and gas supplies and prevent serious overdependence on overseas sources and the financial and national security threats attendant thereto, U.S. energy policy should be focused directly to unlocking these unconventional oil and gas resources. Maintaining price incentives for conventional oil and gas sources has, and will continue to, attract only more overseas supplies to the inflated and cartel-induced U.S. energy price level. The Carter plan to increase the energy price level by a crude oil equalization tax prolongs and solidifies the false assumption that

government research programs and high-risk private investment will relieve the oil and gas supply problem.

Tas policy, to date, has not been advanced to channel private efforts to increase oil and gas supply, particularly from nonconventional resources. Quite the reverse. Consumer tax proposals, guised to reduce energy consumption, have disenchanted both the energy consumer and producer.

TAX INCENTIVES TO INCREASE OIL AND GAS SUPPLY—GENERAL PROPOSALS

The heart of obtaining additions to U.S. oil and gas supply is greater emphasis and expenditures on geological investigations and resource evaluations. Until only recently Devonian black shales were believed to be inferior in oil content. This is now known to be untrue. Other geologic fallacies could be prevalent. Significantly, the U.S. Geological Survey was not included in the new Department of Energy.

Private U.S. geological effort, particularly during the past 20 years, has been directed toward offshore areas and foreign oil and gas prospects. Onshore domestic investigations, as a result, have been limited, and as a consequence, drilling since 1973 has been largely near or within known oil and gas geologic structures. Vast areas of the nation are barely explored, and geologic information in these areas is often poor or nonexistent. Wildcat drilling in the U.S., wells drilled far from present oil and gas reservoirs, is still less than during the early 1960's, a period of a large excess of U.S. crude oil producing capacity in relation to demand. Currently a severe shortage of onshore drilling rigs and drilling crews exists. Most U.S. construction of new rigs has been, ironically, for use in the North Sea and foreign areas.

These facts suggest at least five tax law changes bearing on the oil and gas industry:

(*a*) Reduced tax liability for geological and geophysical efforts to locate new oil and gas supplies.

(*b*) Liberal amortization of investments in onshore drilling rigs and equipment, and training of crews.

(*c*) Deferred tax liability for investment and expenses spent for "Wildcat" drilling.

(*d*) Tax disincentives for activities listed in A, B, and C in foreign areas.

(*e*) Tax disincentives for companies holding oil and gas leases, without drilling, for lengthy periods.

These tax law changes would apply to the search for more conventional oil and gas supplies. More importantly, the tax laws should be reformed toward expediting development of nonconventional supplies. Among numerous methods possible, this could be done particularly by:

(*f*) Providing tax credits for energy research, development and demonstration expenditures against current corporation tax liabilities. Geological and related resource evaluation expenditures should be expressely included.

(*g*) A "Tax-free" period of operation for unconventional energy plants, designated by the secretary of energy, could accelerate completion of such projects. This technique has been utilized in Canada to spur coal mining projects.

(*h*) Tax preferences for corporate entities chartered for unconventional energy development projects with allowance for capital participation by local, State and regional governmental bodies.

THE "SELF-HELP" CONCEPT OF LOCAL ENERGY RESOURCE DEVELOPMENT

The national media, Congressional hearings, and Administration proposals have given almost no consideration to a slowly evolving trend of mutual cooperation or "self-help" energy resource projects. The lack of attention is surprising, since many of the projects, though small, have a high success rate.

In essence, these projects are mutual undertakings of energy producers, energy consumers, and governmental agencies. The idea is to provide funding, usually from several agency sources, to provide monies to develop a local energy resource for industrial fuel usage which will provide local employment. The link of energy supply and jobs usually guarantees governmental support.

These projects can be distinguished from "national" energy plans and programs in that they recognize, and take advantage, of:

1. Regional energy resource availability.

2. Regional industry and transportation characteristics.
3. Regional, state, or local governmental laws, regulations and "ways of doing business."
4. Provide means to assure long-term fuel availability to industries, which cannot be guaranteed by usual suppliers.

The variation in genesis of these self-help, local energy resource projects illustrates the possibilities which tax legislation could encourage their further expansion. For example:

1. A town supervisor in western New York, unable to fund a senior citizen's facility for lack of gas supply, successfully drilled a natural gas well with a HUD grant which will fuel the facility, as well as help fill local school needs.
2. A county government in Kentucky funded a feasibility study to construct low-BTU coal gasifiers for an industrial park, which was then approved from monies provided by the state, the Appalachian Regional Commission and ERDA. The county will raise revenue bonds to meet the final portion of funds required.
3. The governor of Ohio implemented a program to coordinate state agencies to reduce red tape which encouraged industries to drill their own gas wells. Over 100 companies now have their own gas supplies, usually teaming with independent producers.
4. A county in Kentucky has funded a natural gas pipeline from shut-in wells to its industrial park. As a result, the industries were not cut off from natural gas last winter.
5. A county in New York is setting up a revolving fund of money to encourage industries to drill their own wells, the loans to be recovered and paid back to the fund as the gas is produced.

In each of these instances private capital was unwilling to undertake the local energy resource development. The usual reason given was that each project would take too long to pay out. Another reason is that companies are unfamiliar with doing business in partnership with local governments.

A final fiscal approach to encourage local, self-help energy resource development, therefore, could be:

(*i*) Enactment of changes in revenue-sharing legislation to provide "up-front" moneys to State, regional and local governments for energy supply projects related to industrial development and local job creation.

In summary, tax law changes to encourage local energy supply projects, including unconventional fuel sources, would be a positive and new approach to the U.S. energy problem. The recent past has shown that higher prices and a vast federal research agency have had minimal impact on reversing production trends. The results of expanded geologic investigations, as compared to new energy conversion technology, may uncover oil and resources throughout the U.S. which would otherwise be overlooked.

It is usually not mentioned, but for decades Europe was thought to be devoid of oil and gas. The drilling of a "wildcat" well in the Netherlands in the early 1960's discovered the vast Groeningen natural gas field, which was the impetus for exploration in the adjoining North Sea. In 1976 the Netherlands, besides utilizing this gas for its local needs, was the largest exporter of natural gas in the world.

Statement of National Rural Electric Cooperative Association

Mr. Chairman and Members of the Committee, my name is Robert D. Partridge. I am the General Manager and Executive Vice President of the National Rural Electric Cooperative Association (NRECA). NRECA is the national service organization of approximately 1,000 non-profit rural electric cooperatives which provide central station electricity to nearly 25-million farm and rural people in approximately 2,600 of the Nation's 3,141 counties and county-type areas of 46 States.

We appreciate the opportunity to submit this statement on the proposed tax changes designed to modify energy consumption patterns. While the need to modify these patterns can hardly be questioned, we are extremely skeptical about the advisability of attempting to achieve this result through many of the proposed amendments to the tax code. A problem such as that faced by the National today seems too real to be met by a complicated series of incentives and disincentives aimed only at conservation and then only through an artificial pricing mechanism which works to the detriment of the lower income and more petroleum reliant.

In the latter category, almost without exception, and unfortunately too often in both categories, fall rural Americans who comprise the vast majority of NRECA's membership. A recent study done by NRECA, using U.S. Census data, revealed: "Nationally, family incomes in rural electric service areas are 30% lower than in urban areas. Family incomes in REC areas are 23.5% lower than in the U.S. overall." Whether these families are even holding at this level presently is questionable with slumping commodity prices and the increasing illiquidity of the farmer.

In the energy consumption area, I quote from a Wall Street Journal article by Christopher A. Evans published May 12, 1977: "According to some estimates, up to 25 percent of the farmer's total cost of production goes for energy, thanks largely to a doubling of petroleum-based energy prices in the last four years. The petroleum fuels, chiefly diesel fuel, liquid propane and gasoline, account for an estimated 70 percent of the farm's energy consumption. Most of the rest is electricity, whose prices have risen also, by 25 percent to 40 percent in the past two years. (Natural gas isn't readily available in most rural areas, so it isn't used much by farmers.") An additional analysis done by our staff points out that 85 percent of the workers living in rural areas rely on cars for transportation to work, 77 percent in urban areas. One percent of those workers rely on public transportation in rural areas as opposed to 11 percent in the urban areas. In 1974, statistics for passenger cars alone (excluding trucks, tractors and other farm vehicles) reveal that the average use of that vehicle was 12,300 miles versus 8,430 for the urbanite. All of this adds up to a heavy reliance on petroleum products with less income to absorb price increases.

After looking at these facts, let's see how rural Americans fare under the proposed tax aspects of the National Energy Act. The answer can only be "poorly and unfairly." I think that few could deny that the thrust of the majority of the proposals before this committee is conservation through increased prices. This can be nothing short of disastrous for rural families, both because they cannot afford it and because there is less opportunity for conservation. And what will be the result of their sacrifice? Evaluations by the General Accounting Office, by the Congressional Budget Office, and by the Library of Congress indicate that projections of energy savings by the Administration are overly optimistic.

These proposals seem to assume that energy consumption is a luxury. It is generally not a luxury to rural America where little public transportation is available and 25 percent of the costs of producing food and fiber, as previously indicated, are for energy. Nor is much of the individual transportation a luxury: Automobiles and good highways have had much to do with revolutionizing the style of living for rural Americans. Rural families today live little differently from their urban neighbors; and much of this can be attributed to the greater accessibility of urban areas with better schools, cultural and job opportunities.

Let me now specifically comment on some of the proposals before your committee. First is the Crude Oil Equalization Tax and Rebate Plan. We view this tax, which raises the price of a barrel of oil to the world (OPEC) level by 1980, as nothing more than a sales tax which is as always regressive. Not only does it discriminate against lower income families but also against those who are more dependent upon petroleum-based products. The poor, who are not particularly dependent upon such products, might be made whole by the proposed rebate plans, but those who are more dependent upon petroleum-based products are in no way made whole by this proposal. Unfortunately, as previously pointed out, families served by NRECA's membership are generally lower in income and more petroleum dependent.

Let me now make two final points about the Crude Oil Equalization Tax. First we question whether the tax's affect will be only 7 cents per gallon, having seen studies which forecast as much as 15 cents per gallon; and, secondly, this tax adds further legitimacy to a cartel (OPEC) set price which has no relationship to free market price.

We see no way to perfect this tax which deals one more severe blow to the already suffering rural economy of this country. H.R. 8444 as passed by the House attempts to moderate the effect of this tax on rural families by providing some tax relief for natural gas liquids. Such assistance is hardly more than symbolic and does nothing to assist the person who must commute 50 miles by automobile each way to work or who is unfortunate enough to live in one of the areas of the United States where electricity is generated by oil. For these reasons we urge you to remove this tax from the proposals before you, and to consider other alternatives; for example S. 2073, a proposal by Senator Bennett Johnston

which seeks to modify the crude oil pricing formula legislated in the Energy Policy and Conservation Act (EPCA).

We are also concerned about the effects of the proposed Excise Tax on utility use of oil and natural gas.

Initially, I believe there is a misconception that a tax imposed on a business or utility does not in some way affect the consumer. Surely, nothing could be further from the truth, especially in the utility industry. Whatever the tax imposed, it flows directly through to the consumer, as do the costs of replacing or converting oil and gas facilities, many of which will have hardly begun their useful life spans.

It is difficult to even approach estimates of the costs of this tax upon our systems and rural Americans in general. This is true primarily because of the mixture of sources from which our systems purchase power: from investor-owned utilities, from self-generation and that which is secured from other sources such as federal projects. The cooperatives themselves do however have a generating capacity of approximately 2,300 megawatts produced by gas and 800 to 900 megawatts produced by oil. Replacement and conversion of these plants will cost between one and two billion dollars. To give you some idea of the impact on the entire rural electric program, compare those figures with the fact that only slightly over eleven billion dollars in direct loans have been made by REA since the REA lending program was established in 1936.

The impact of conversion costs and use tax liabilities becomes even more substantial when we realize that the costs are attributable to a limited number of states and systems. For example, the cost of conversion for Texas alone would be at least $400 million (not counting the costs of purchasing power, even if it is available) while plants are shut down from 19 months to 2 years. The costs of the excise tax for the Chugach Electric Association serving part of Alaska would be $32.0 million in 1985 alone and would raise rates by 53 percent. The Alaska case is particularly poignant as there is little likelihood that conversion or replacement would be feasible, yet the co-op would be subject to the tax.

Basically, let me summarize our position on the utility use tax by stating that we oppose the tax as unnecessary. The mandatory conversion portions of the National Energy Act mandate conversion, except for specific exemptions by 1990, and the Energy Supply and Environmental Coordination Act already in existence authorizes FEA to order conversions. However, if the tax is put into effect, we would suggest that it not be imposed until some time after 1983, exempting, as did the House in H.R. 8444, at least plants of 100 megawatts or less from the tax; and, most importantly, providing for a complete consistency between mandatory conversion standards and exemptions, and the imposition of a use tax. To find one's self exempt from mandatory conversion but subject to a use tax seems unconscionable. To impose upon the utility industry or the government more bureaucratic procedures, such as that provided for in the House bill wherein a business or utility must go through two separate procedures—one on mandatory conversion and a separate one on whether a tax is imposed or not—just does not make good sense. We also think that it is important that any use tax imposed upon the use of natural gas as a boiler fuel be tied to the price of residual fuel oil, as is done in the House bill, rather than to the BTU equivalency price of No. 2 distillate.

We also feel that the rebate plan for user taxes imposed is somewhat inequitable as far as rural electrics are concerned. We can foresee cases where the rural electric pays a use tax to the investor owned utility through increased rates, the utility receives a rebate for conversions which is only rebated to the purchaser over the life of the plant, yet the rural electric brings its own plant on line in 1990 or shortly thereafter. Under such circumstances the rural electric system is paying for a plant it will not use. The investor owned utility also has the option to take an additional investment tax credit or rebate, an option not available to the rural electric or municipal system. For these additional reasons, we feel that the user tax and rebate plan are not proper tools to bring about conversion. Why use, or misuse, the tax code in this manner? If conversion is a necessity, why not take a more direct approach and provide for grants, low interest loans and guaranteed loans as a means of aiding conversion? Once again, let me reemphasize that this tax and the costs of conversion come from the consumers' pocketbook, not the business' or utility's, and these costs are not spread evenly throughout the country but are regionalized.

Finally, let me indicate our support for the proposed tax incentives for residential insulation and conservation. We do feel, however, that these incentives

should be modified in some way to make them available for lower-income persons. The gasoline tax is objectionable for many of the same reasons we find the crude oil equalization tax unfair. We especially feel, however, a lack of a necessity for such a tax or a gas guzzler tax if mandatory mileage performance standards are placed on automobiles.

Let me summarize by stating that the position of our membership has been that an artificial pricing mechanism such as proposed here is an unfair method of allocating scarce natural resources, and its effectiveness is unproven. It is also our belief that the use of the tax code as a means of redistributing wealth is just and proper, but its usage as a means of redistributing income without regard to the level of such income is far less defensible; and a great deal more money is certainly collected from rural America under these proposals than is being returned.

NRECA appreciates the opportunity to submit this statement to the Committee, and will provide any further clarification or information which may be desired.

HUDSON OIL CO.,
Kansas City, Kans., September 14, 1977.

Mr. MICHAEL STERN,
Staff Director, Committee on Finance, Dirksen Senate Office Building, Washington, D.C.

DEAR MR. STERN: We wish to express our grave concern regarding the effect of the Crude Oil Equalization Tax on the FEA's Small Refiner Program.

We would like to submit the attached statement for the record in support of the testimony delivered yesterday to your Committee at the public hearing on the National Energy Act by the representatives of the three Small Refiner organizations, namely:

1. American Petroleum Refiners Association
2. Independent Refiners Association of America
3. Independent Refiners Association of California

Yours very truly,

MARY HUDSON, *President.*

Enclosure.

My name is Mary Hudson and I am the co-founder and President of Hudson Oil Company of Kansas City. Since 1932, Hudson Oil has grown from a service station in Kansas City to a nationwide retail gasoline marketer. Hudson grew because we served the public when and where the public wanted with the lowest priced gasoline.

In February of this year, Hudson bought a small refinery in Cushing, Oklahoma to make sure that we could continue to serve the public. We bought the Cushing refinery with every expectation that there would be continuing governmental recognition of the very valid needs of the small refiner sector of the petroleum industry.

The independent marketer and the independent refiner who supplies him are the only competitive forces in the oil industry today. To ensure that the oil industry continues to operate within the American free enterprise system, the new energy program must provide for the continuation of a crude cost offset program for the small and independent refiner.

In closing, I would like to refer to a recent FEA report on the competitive position of the small and independent refiner. This report states that the investment in a small refinery could be paid out in as little as 18 months. Our bankers dearly wish this were true, but believe me, it is wrong. For us, the continuation of a crude cost offset program is a matter of survival.

STATEMENT OF THE AMERICAN SOLAR ENERGY ASSOCIATION, INC.

PREFACE

The American Solar Energy Association recognizes that this Committee's considerations may be limited only to the taxation and other financial considerations of the administration's proposed and House-passed provisions of HR 8444. Notwithstanding, however, any such limitations, ASEA's remarks may address non-

tax and non-finance matters, because the finance and tax aspects of the present legislation cannot, from a practical point of view, be segregated from other considerations.

To the extent therefore, that this statement strays from strictly tax and finance-related matters, we beg the Committee's indulgence.

GENERAL COMMENTS RELATING TO THE GOALS OF ASEA

To fully understand the thrust of ASEA's comments, this Committee should know that ASEA's objective is to create a contemporary, widespread market for solar heating and cooling equipment, which is mass-produced for residential and commercial applications that are essentially low-cost, safe, technically simple and reliable.

Therefore, ASEA looks toward legislative proposals that will enhance this objective.

With similar predilection, ASEA considers solar energy as a resource of energy as much as coal, petroleum, natural gas and uranium are resources. That the latter resources are tapped by the driller's bit or refinery's piping, rather than the simple flat plate collector, renders such traditional sources of energy no more nor less a resource than solar energy. Rather, in terms of tax and other advantages, both solar and traditional fossil and nuclear resources should be placed on a par. Indeed, perhaps solar energy, which is inexhaustible as a practical matter, should be given a slight edge in legislative matters over its fossil and nuclear friends, both of which ultimately burn up—and out.

I. ELIMINATION OF SOLAR ENERGY FROM RESIDENTIAL CONSERVATION PROGRAM

We must strongly object to the elimination of solar energy as one of the residential energy conservation measures which utilities must investigate, recommend, and, where appropriate, finance under the provision of Title I, Energy Conservation Programs For Existing Residential Building.

The House version of the National Energy Act (NEA) includes installation of solar equipment under the definitions of "Residential energy conservation measures." These residential energy conservation measures form the foundation for a massive federal-State-public utility program. This program includes residential inspections, recommendations on "measures" to improve energy efficiency, supplying of contractors names for recommended work. It also provides for financing of recommended "measures" where the homeowner elects to adopt the measures. Finally, utility companies are put in the same position as banks and lending institutions, in that they may make loans to their customers which are 90 percent guaranteed under various banking act provisions.

Thus, the overall plan calls for inspection, recommendations, and financing by utilities of "residential energy conservation measures." Yet, installation of solar equipment is not included in the S. 2057 bill as a residential energy conservation measure.

As a consequence, public utilities are not required to either inspect for, recommend or finance solar energy equipment—the very equipment that offers the best means of conserving precious fuel supplies and which, incidentally, competes most significantly with the products which the utilities sell.

As pointed out in our telegram to Senator Long on September 16, 1977, a copy of which is attached, solar systems do not qualify for the loan guarantee program. Under this program "energy conserving improvements" can be guaranteed up to 90 percent. Yet "solar conservation improvements" embrace specifically only "energy conservation measures" under § 101. Those measures, as pointed out above, do not include the use of solar energy systems. Thus, homeowners are deprived of a means of financing solar installations by utility companies.

Because of these measures, we fail to understand how the Senate will provide for the tax credits for installation of solar equipment. We would appreciate appropriate floor amendments to reincorporate subsection [I] of § 101 of H.R. 8444 back into the provisions of § 101 of S. 2057.

II. CRUDE OIL EQUALIZATION TAX AND ITS USE

The American Solar Energy Association condemns the crude oil equalization tax in the form appearing in H.R. 8444 and twin Senate versions. The tax should either be rejected totally or put to some use consistent with the praiseworthy purposes of the National Energy Act.

A. Criticism of the Tax—Alice in Wonderland

The crude oil equalization tax presents a new topic for the Mad Hatter in Alice in Wonderland:

The Hatter: We shall raise the price of oil by placing a tax on it. The higher price will encourage frugality at home and conserve this precious resource.

Alice: But that would be inflationary and hurt the people.

The Hatter: Don't worry, dear. We shall simply give the tax back to them and no harm's done.

The purpose of this tax is to artificially raise the price of domestically produced crude oil to the level of international prices, i.e., practically speaking to levels set by the Organization of Petroleum Exporting Countries (OPEC).

One must question the need for this tax in the first place. OPEC prices, which the tax seeks to attain, are admittedly artificially high in terms of production costs. What purpose could this tax hope to achieve in racing to create an equally arbitrary price.

Second, the tax is to raise the price of fuels in order to curb demand. It is then refunded to ease the burden of the price increase on each consumer. That is, the tax is imposed with the left hand and refunded with the right. As noted in the House Report 95-543, p. 71: ". . . The recycling of price-raising energy taxes is to be accomplished primarily through reduced withholding of Federal income taxes. This approach should substantially restore real purchasing power but will not neutralize the inflationary impact of higher energy prices . . ." Thus, no conservation is to be encouraged since those who pay the tax get it back, especially if they are using heating oil in their homes. The oil industry is not encouraged to greater production through higher prices, since the add-on tax does not innure to the industry's benefit. No revenues are raised for any other energy purpose, since all raised revenues are refunded.

Third, the crude oil equalization tax is apparently inflationary, without any real benefit to consumers. The only use of this tax is to offset the apparent inflationary impacts, which the tax itself creates.

Finally, the tax apparently benefits only the Organization of Petroleum Exporting Countries (OPEC). OPEC may now set U.S. crude oil prices under the bill, since domestic prices are automatically adjusted to OPEC levels. Additionally, the growing disparity between "our" prices and "theirs"—something increasingly likely to outrage American consumers—will be glossed over by the apparent equality of prices. Thus OPEC will be encouraged to increase prices to ever-higher levels without fear of public outcry, for the United States will equal OPEC's prices every time. Most simply put, the United States will now be a member without voting rights in OPEC.

B. Uses of the Equalization Tax

ASEA respectfully suggests that imposition of the crude oil equalization tax might be justified by earmarking the revenues raised for the special projects set out in S. 2057, recently approved by the Senate Committee on Energy and Natural Resources, reported in S. Rep. 95-409, as well as some additional programs set forth below.

The critical consideration here is that the revenues to be raised by the crude oil equalization tax (and liquified gas tax as well) could offset all of the costs of the programs outlined in S. 2057, increase the budget of those programs and go far toward meeting nearly *all* the $10.4 billion budget of the newly created Department of Energy which begins operations on October 1, 1977.

1. Use of tax as a conservation measure

Use of the equalization tax to fund energy programs offers an excellent conservation incentive.

For example, the initial tax of $3.50 per barrel rounds out (at 42 gallons per barrel) to 8.3 cents per gallon. The average home fuel oil tank takes about 200 gallons per refill. Thus each homeowner would see an immediate $16.00 added to his monthly heating bill, assuming, as one may safely do, a direct pass through of the entire tax to the consumer.

Several beneficial results occur, in addition to raising funds for the National Energy Program. Thermostats will go down to 65° (and will not slowly inch back up, as they have in the past). Storm windows, caulking, weather stripping,

and attic insulation leave the category of "a good idea, I'll look into it someday," and become a necessity to recoup the immediate rise in cost. It is interesting to note that thorough weatherization can reduce fuel costs by approximately 25 percent, a figure which exceeds the 18 percent increase in costs represented by a 8.3 cents per gallon rise on current fuel oil costs of 45.7 cents per gallon (Exxon Oil Co. quoted price, delivered in Washington, D.C. metropolitan, September 14, 1977).

Additionally, solar heating and cooling systems, which can reduce fuel costs another, conservatively speaking, 40–50 percent, cease to be dreamed of systems in some distant future. Rather solar systems become a realistic, cost competitive means of heating and cooling one's home.

But if our representative homeowner can anticipate some refund of the 8.3 cents per gallon increase, he will leave matters as they are. Therefore, ASEA urges the imposition of this tax, its non-refund and its use in energy programs as an immediately effective conservation measure. After all, one must remember that a measure as equally effective as the tax refund in offsetting the inflationary impact of increased fuel oil costs is to turn down the thermostat, which is really what the National Energy Act is all about.

2. Revenues raised from the crude oil equilazation tax and their use—cost of programs and economic impacts—costs of department of energy

The revenues estimated to be raised from the crude oil equalization tax are approximate, as reported in H. Rept. 95–543, to accompany H.R. 8444. They are, starting in 1978, $3.8 billion and rising to approximately $13.5 billion by 1981, see H. Rept. 95–543, p. 78.

The estimate costs of the programs in S. 2057, favorably reported by the Senate Committee on Energy and Natural Resources on August 27, 1977, are:

Year:	*Cost in millions*
1977	0
1978	$146.7
1979	356.8
1980	477.7
1981	128.2
1982	55.1
Total	1,166.5

Thus, it is readily apparent that the crude oil equalization tax can easily cover the entirety of the programs of S. 2057.

In addition, the crude oil equalization taxes can cover the entire budget of the newly created Department of Energy, which will commence October 1, 1977. That budget is, according to the Presidential "Press Release" of September 13, 1977, is as follows for the new Department and for activities transferred from previous, amalgamated departments, such as FEA, FPC, ERDA and the like is estimated at $10,432.4 million.

At this point the combined costs of the S. 2057 proposals and DOE budget have not yet exceeded the crude oil tax revenues. We suggest that the some $3.0 billion could be used to enhance and financially strengthen the programs of S. 2057, and H.R. 8444. For example, instead of tampering with an already too complex tax structure by offering tax rebates for weatherization and solarization of homes, direct grants in and to low income families might be made from these remaining funds. Certainly the funds could be used to offset the losses to the Treasurer occasioned by the proposed tax incentives for weatherization and solarization. These losses are estimated in H. Rept. 95–543 to be at p. 92.

Year:	*Dollars in millions*
1978	253
1979	373
1980	413
1981	450
1982	445

Some specific proposals to enhance the programs of S. 2057 and H.R. 8444 are contained herein, with estimated costs, where appropriate.

III. THE SOLAR ENERGY TAX CREDIT

A. General comments

The American Solar Energy Association (ASEA) endorses with concern the proposed $2,150 maximum credit for installation of solar energy systems. There are several reasons.

First, ASEA feels that the "tax credit" should immediately receive a different nomenclature, assuming this part of the bill is enacted. Surveys indicate that most people consider the so-called "credit" not a credit against taxes, but rather an itemized deduction. Thus, many taxpayers who file returns with a standard deduction without itemization feel they do not qualify for the special solar provisions. It should be made clear that the "solar credit' is a direct tax refund, regardless of income or filing status. We suggest such notification be incorporated in the 1040 and 1040A forms.

Second, we doubt the effectiveness of the tax credit when compared to other means of enhancing conservation of energy and utilization of solar systems.

The two unfortunate aspects of the present proposal are that it creates yet another tax advantage in an already overly complex taxing structure and that it may create unrealistic markets and profits in solar industries.

On the first issue, the legitimate purposes of our tax laws should be to raise revenue for the positive goals of our government. Creating yet another "tax loophole" in the form of tax credits adds complications to an already too complex system. The solar energy goals might better be realized through federal payment of inspection costs to determine whether solar systems will work in a particular residence on building, through Small Business Administration loans for solar companies, or through direct grants in aid for installations in public buildings. More on this follows.

On the second issue, we feel that solar manufacturers, distributors and contractors may be encouraged to enter into and develop markets which are made "profitable" through tax advantages. Yet these tax-created markets may prove "unprofitable" in real market situations once tax advantages terminate. Thus, a contractor may be encouraged to develop markets which are profitable in the short term, but are unrealistic in terms of comparative costs to traditional heating and cooling systems in the long run. This marketing approach could prove ultimately detrimental to the solar industry. We submit that better positive programs are available, as outlined herein.

B. "Double Dipping"—The tax credit or loan program, but not both

Despite ASEA's reservations regarding the tax credit, such a measure nonetheless may be one useful tool in encouraging an ascent industry to bloom.

The provisions of S. 2057, however, have the effect of destroying the tax credit advantage where a taxpayer takes advantage of either the Ginnie Mae or Fannie Mae loan guarantee program (See § 115, sub. nom. "§ 314(b) (4)" of S. 2057) or the direct 4 percent loan program administered by the Secretary of Housing and Urban Development (see § 116(b) (2) (D) of S. 2057). These provisions seek to prevent what is popularly called "double dipping."

We strongly urge the committee to remove these provisions affecting the tax rebate. If the rebate is a good idea as an indirect means of capitalizing private investment in solar equipment, it becomes no less a good idea because one obtains a federal or federally guaranteed loan. Certainly two federal advantages are gained. But one, the loan, has to be paid back. Additionally, cancellation of tax benefits for those who must borrow to finance installations unfairly discriminates in favor of those rich enough to pay cash.

IV. COMMENTS ON SENATE BILL 2057

Recognizing that the Senate Finance Committee is concerned with principally tax matters, ASEA nonetheless feels some comments are in order regarding S. 2057, the National Energy Conservation Policy Act. ASEA feels these remarks appropriate because of the large implications the programs of S. 2057 may have regarding consideration in tax matters.

A. The Utility Program Regarding Residential Energy Conservation Plans.

Section 183 of S. 2057 establishes a State program, administered through State Public Service Commissions. Under this program, public utilities will offer by

January 1, 1980, information services or arrangements relating to the purchase and installation of residential energy conservation measures.

This section further obliges public utilities (i.e., gas and electric companies) ". . . offer such residential customer the opportunity to request the public utility, for a reasonable fee, either directly or through one or more approved contractors, to inspect the residential building to determine and apprise the residential customer of estimated cost of purchasing and installing, and savings in costs of home heating and cooling that are likely to result from installing each suggested measure:"

We most strongly object. As we noted in our letter to the Honorable Russell B. Long, Chairman, Senate Committee on Finance: "We must view with skepticism that the very utility companies that earn their living through the sale of natural gas and electricity will conduct residential inspections and, thereupon, encourage their customers to take steps to reduce the use of the products that the utilities sell. This skepticism is particularly justified in the solar energy area, where residential use of solar energy can cut heating and cooling costs by 75 percent. It is equally valid for other energy conservation measures which reduce the amount of natural gas and electricity consumed in the home.

"We suggest that the utility companies be relieved of the dilemma of making inspections and offering conservation plans that will reduce their sales and profits. The task of making inspections and developing conservation measures for specific homes should be left to private solicitation by heating and cooling contractors or to state contractors, all under government supervision. Much as our automobiles are inspected by independent garages, so can our homes be inspected with an eye toward installing products (such as insulation, solar heating, and the like) which the contractor has a strong interest in selling."

We renew our objection. At least under the provisions of H.R. 8444 (See § 104 (d)) public utilities had some monetary incentive in that they could finance the installation of energy conservation measures through loans guaranteed by the federal government. Section 103(b)(1) of S. 2057, however, prohibits utilities from making such loans. Thus any monetary motivation for making recommendations, which might result in the reduction of use of the gas and electricity which utilities sell, is gone.

We urge this Committee to strike or amend these provisions. We encourage the use of the crude oil equalization tax fund to pay for independent inspections of residences by private engineers and consultants. Such payments could be either directly reimbursed upon submission of proof of inspection and payment therefore by the homeowner. Payments by the government should be limited to $100 per residence or $50 per unit in multifamily dwellings, not to exceed $200.

This directly compensated inspection program by inspectors supplied by State Public Utility Commissions (or from lists prepared by them) would assure an immediate—and more importantly, impartial—inspection of American residences to develop appropriate energy conservation measures.

B. Solar Development Direct Loan Program

We praise the program created in § 116 for the creation of a HUD administered direct loan program at 4 percent. This program should give a great boost to the solar industry by making available a lender of last resort.

We feel the concept should be expanded, especially if solar installations are precluded from the loan guarantee program as pointed out above.

For example, the crude oil equalization tax could be utilized to increase the fund to $10 billion. The program should be extended to 30 years to enable "paid back funds" to be recycled each 10 years.

Additionally, the loans should be extended to small businesses, in lieu of Small Business Administration participation. This would enable heating and cooling as well as strictly solar companies, to stock inventories of solar equipment, systems and subsystems so that a ready supply will be available for installation.

Additionally, we would seek to include commercial lending institutions in this program. For example, banks might approach the reserved fund to borrow money from uncommitted funds much as banks borrow from the Federal Reserve Banks under the Federal Reserve System.

We prefer that the program be administered by the Federal Reserve System, rather than the H.U.D. The program is, after all, a banking function rather than an energy function. The Federal Reserve, working through member banks, is much better equipped than H.U.D. to administer this program.

We hope floor amendments on conference committees will achieve these results.

C. Creation of a jobs program

No present proposals take advantage of the unique opportunity which the solarization program offers for creating jobs.

Solarization of homes is basically a simple technology. As such it offers an opportunity for mass employment of skilled and unskilled workers in the construction and trade industries.

Implementation of this program might be achieved through the procedures outlined in our testimony before the Small Business Administration Subcommittee of the House on July 27, 1977. We urge review of these proposals in the attached copy thereof.

CONCLUSIONS

We urge the Finance Committee of its own motion and in joint House-Senate conference to adopt the measures which we have proposed above.

Respectfully submitted on behalf of ASEA,

G. JAMES FRICK, *President.*
JOHN F. LILLARD, III,
Vice President and General Counsel.
SEPTEMBER 16, 1977.

TELEGRAM

To: Hon. Russell B. Long, Chairman, Senate Finance Committee, U.S. Congress, 2227 Dirksen Building, Washington, D.C.

From: American Solar Energy Association, 928 Barr Building, 910 17th Street NW., Washington, D.C.

MESSAGE

We are alarmed at the elimination of solar energy systems from the Federal Energy Act Residential Conservation Program and Loan Guarantee Program. The House passed bill H.R. 8444 includes installation of solar systems as a residential energy conservation measure qualifying for $2,150 tax credit. Section 101 of the Senate passed bill 2057 eliminates solar systems as an energy conservation measure. We fail to understand how your committee will give tax credits for solar energy equipment under S. 2057. We further protest that solar systems are not included in the definition of energy conserving improvements for Federal loan guarantees under Sec. 111 of S. 2057 and related provisions. We urge floor amendments to correct these deficiencies.

G. JAMES FRICK, *President.*

AMERICAN SOLAR ENERGY ASSOCIATION, INC.,
Washington, D.C., August 29, 1977.

Hon. RUSSELL B. LONG,
Chairman, Senate Committee on Finance,
U.S. Senate, Washington, D.C.

DEAR SENATOR LONG: We write in response to the recently passed House version of the National Energy Act, H.R. 8444. We will offer testimony to the Senate Finance Committee in greater detail, but hope that the Senate will focus attention on these areas of concern during the hearings. Our concerns relate to the following changes and additions to the present form of the bill.

The efforts in the Act to create an energy conservation program are praiseworthy, the hand-maiden selected to carry out this program, however, is not.

By January 1, 1980, the proposed statute directs that all utilities will advise customers of general conservation measures, and offer specific suggestions through inspections of individual homes. The utility companies will offer State prepared lists of installers and contractors, and financial institutions for loans. Use of solar energy equipment trails the list of the many traditional energy conservation measures which may be suggested, such as storm windows and insulation.

We must view with skepticism that the very utility companies that earn their living through the sale of natural gas and electricity will conduct residential inspections and, thereupon, encourage their customers to take steps to reduce the use of the products that the utilities sell. This skepticism is particularly justified in the solar energy area, where residential use of solar energy can cut heating and cooling costs by 75%. It is equally valid for other energy

conservation measures which reduce the amount of natural gas and electricity consumed in the home.

We suggest that the utility companies be relieved of the dilemma making inspections and offering conservation plans that will reduce their sales and profits. The task of making inspections and developing conservation measures for specific homes should be left to private solicitation by heating and cooling contractors or to state contractors, all under government supervision. Much as our automobiles are inspected by independent garages, so can our homes be inspected with an eye toward installing products (such as insulation, solar heating, and the like) which the contractor has a strong interest in selling.

Second, we fail to understand the deemphasizing of solar energy to the status of inclusion in the bill as merely another version of energy conservation, along with window caulking and weather-stripping. We must stress that solar equipment does not just conserve our valuable fossil fuels, it replaces them. Replacing fossil fuels for low grade uses, such as commercial and residential space heating, preserves these fuels and postpones, perhaps indefinitely, the necessity of turning in a massive way to nuclear energy.

We suggest that greater emphasis be placed on the immediate use of solar energy. We can and should solarize 5 million homes a year—not the paltry 2.5 million suggested goal for 1985. We can also solarize commercial and industrial establishments on a massive scale where solar equipment offers an even more efficient use than in the home.

Third, the bill's financial assistance programs are inadequate and misdirected if we are to assure rapid development of solar energy. True, moderate and low income families receive various forms of aid. But what of the vast majority of middle class people, the very people with the education and sophistication to see solar energy as the sensible and economic way to meet rising energy costs. The middle class is left without financial assistance in favor of the moderate income and poor.

Without disparaging their plight, the poor are for the most part renters, with little or no interest in making a substantial investment in someone else's property. We strongly urge that the favorable loan treatment in the Act be afforded to all Americans, not merely those least able or likely to use them.

Fourth, the crude oil equalization tax should either be used for something or abolished altogether. This technique of raising domestic crude prices to the level of foreign crude baffles the reader. The bill imposes the tax at the well-head. It is then, presumably, passed on by the producer to the consumer of petroleum products. Finally, the tax is rebated to the consumer, who is the person who ultimately paid the tax in the first place. This slight of hand accomplishes nothing.

It is puzzling why the crude oil equilization tax is not put to some use. For example, instead of rebating the tax to those who use oil, why not give grants in support of those who install solar heating and cooling equipment, or who tap wind, water and geothermal resources. Such use would raise domestic oil prices in a real way, thereby conserving oil use.

Finally, can we please stop appropriating funds for continued research and development and demonstration projects in solar energy. We don't need any more research and development. Solar energy is not a complicated technology and we need it now. Let us quit researching and start using, by providing a marketplace for solar energy, through government sponsored programs designed to publicize the low cost and efficiency of solar systems and through government requirements that solar energy be used in all government financed, constructed or owned property.

We feel the present bill requires several additions, most of which were mentioned in our Report to the House Small Business Committee on July 27, 1977, a copy of which is enclosed.

Establishment of a Solar Development Bank along the lines proposed by Representative Stephen Neal in H.R. 7800:

—creation of a jobs program employing the hard core poor and minorities in low technology solar energy and insulation industries;

—direct educational aid and long term capital loans for small businesses which want to or already have entered into either solar energy or insulation industry, including SBA assistance;

—a marketing program for solar energy;

—uniform State laws exempting solar heating and cooling equipment and insulation from local property taxes for a specified period of time;

—public and private development funds to pay the cost of assessing whether in individual applications solar heating and cooling and insulation can be utilized;

—uniform federal standards on product reliability and performance in the solar and insulation fields;

—federal housing standards on new housing designed to reduce energy consumption and to penalize the "gas guzzler" home;

—increased tax incentives for installation of solar equipment and insulation, such as amortization and depreciation of costs on individual, non-business tax returns.

We look forward to an opportunity to expand on these themes through oral and written testimony to be submitted for your Committee's consideration. We urge you to consider these matters in your forthcoming hearings and debates on the National Energy Act.

Sincerely yours,

G. JAMES FRICK,
President.

JOHN F. LILLARD, III,
Vice-President & General Counsel.

JOBS AND SOLAR ENERGY—REPORT TO CONGRESS HOUSE COMMITTEE ON SMALL BUSINESS, JULY 27, 1977

AMERICAN SOLAR ENERGY ASSOCIATION

(By: John F. Lillard, G. James Frick)

ABSTRACT

The year 1977 has brought into focus 2 major problem areas in the United States: jobs and energy. We know we need more jobs. We know we need to use less energy. But we have failed to consider that a solution to the energy problem can also be a solution to the unemployment problem: solar heating and cooling of American homes. Congress should use solar energy as a jobs program.

The American Solar Energy Association has been formed to represent the burgeoning solar industry. We need the help of Congress to develop our industry. We offer the following solution to the jobs and energy problems as a straightforward method by which our industry might grow and the American people might be greatly benefitted.

Our industry proposes to put one million people back to work. Solar heating and cooling systems will be installed by small businesses in every community in America, which will create hundreds of thousands of jobs per year for unskilled and semi-skilled minorities, veterans, women, and the construction trades. New and exciting jobs will be created in manufacture of components, design of systems, installation of solar systems, and maintenance of installed systems. Congress' Office of Technology Assessment last month observed that "onsite solar technology appears to be more labor-intensive than contemporary techniques for supplying energy," "since onsite solar equipment would undoubtedly be designed, manufactured, financed, installed, and operated by the same organizations currently associated with the contsruction of buildings and industrial facilities," and concluded that "in the short term, the introduction of solar energy devices will create jobs in trades now suffering from serious unemployment."

Solar heating and cooling is a small business enterprise. Small business, not large business, will be the distributor and installer of solar equipment. As this committee observed in a memo described by Jack Anderson two weeks ago, small business, not large business, creates jobs. Because solar technology has already been developed, thousands of building contractors stand ready to hire unskilled and semi-skilled laborers in their own home towns. Likewise, in the cities and industrial centers, hundreds of manufacturers and their suppliers, architects and engineers, and wholesalers and distributors are prepared to hire the hard-core unemployed urban workers.

The Small Business Administration is wrong when it says that the solar industry has limited potential or is speculative. The potential, in the residential, commercial, and farm applications alone, is a staggering 45 million homes and 15 commercial and farm buildings, which could be retrofitted with solar systems, and 2 million new structures per year, which could be solar structures. The

Energy Research and Development Administration has established, after 3 years under the Solar Heating and Cooling Demonstration Act of 1974, that solar equipment is amply available, simple in design, serviceable, and reliable. ERDA has shown a great potential for farm use of solar equipment in crop drying, heating of barns and hot houses, and low heat applications. SBA has attempted to over-complicate a very simple concept and looks at solar firms with a jaundiced eye.

We ask Congress to step in to help our industry grow so that American homes and businesses can be solarized within months, not years. We ask that Congress help create the supply of solar systems by encouraging the growth of small businesses willing to install solar equipment, and help create the demand for solar systems by incentives to homeowners and businessmen to purchase them. Clearly, contractors won't enter the solar business unless they can get a loan to start up the business. Also, clearly, there will be no widespread demand for solar systems unless the homeowner has tax incentives, mortgage money, and legal incentives to convert his home.

Accordingly, ASEA submits the following legislative proposals:

—overall, an emphasis on marketing of solar equipment;

—direct loans or loan guarantees by SBA, FHA, VA, and HUD to firms engaged in any phase of solar business;

—HUD loans, Ginny Mae and Fanny Mae loan guarantees and subsidies to families, in addition to tax credits and accelerated depreciation allowances for solar systems;

—low interest loans and grants to low-income homeowners for solar systems;

—$2,000 tax credit for installing solar system in home, notwithstanding Ginny Mae or Fanny Mae interest subsidy;

—flexible limit for loans and grants for commercial and farm applications, above those limits for homes;

—300 percent depreciation for solar and energy improvements, deductable over 10 years (e.g., $3,000 per year for $10,000 system);

—federal housing standards for insulation and energy efficiency which must be met when home or building is sold;

—grants to states and cities to license and enforce standards;

—federal control and standards to assure safety and reliability of solar and energy saving systems;

—tax incentives to encourage long-term, not short-term, loans for solar retro-fitting (i.e., first mortgage 30-year $85/month payments, not "home improvement" loan 5 to 15-year $200/month payments).

There can be no complaints based on the cost of the U.S. Treasury of these proposals. Not only will solar energy save $35 billion per year in oil imports and $35 billion per year in the balance of payments deficit, but the reduction in unemployment will save the Treasury $8 billion per year in welfare costs and lost income taxes. The development of the solar industry will not only produce an economic stimulus to the states in the industrial and cold Northeast, but it will encourage the growth of small business across the land.

I. SMALL BUSINESS IS KEY TO THE DEVELOPMENT OF SOLAR ENERGY

There are myths surrounding the development of solar energy. The Small Business Administration has been standing in the way of the development of solar energy because of its belief in those myths. SBA believes that solar energy has limited potential. SBA believes that the solar energy industry is a speculative industry, and that the risks are not worthy of SBA financial assistance. SBA believes that solar technology is in its infancy. SBA believes that large corporations, not small business, will dominate the solar field as they have the oil, coal, gas, and electric industries. We must respectfully draw Congressional attention to the error in SBA's beliefs.

The solar energy industry certainly does not have a limited or uncertain potential. Putting aside the potential for providing mechanical and steam power for pumps, turbines, and a myriad of other equipment, as well as the generation of electricity, and the farm applications for improving crop, livestock, and fish production, the simple use of solar energy to heat and cool buildings has overwhelming potential. ERDA has shown, after 3 years under the Solar Heating and Cooling Demonstration Act of 1974, that the market for solar equipment depends upon (1) availability of equipment, (2) equipment being simple in

design, (3) equipment being serviceable, and (4) systems being reliable. ERDA has recently reported that solar energy has already reached those stages in its development. Of course, the solar industry will receive its biggest financial boost from the home heating and cooling market. There are 45 million existing American homes, 10 million apartment houses, 15 million commercial and farm buildings, and millions of square feet of industrial space. There are over 2 million buildings constructed every year. Even looking only at the 6 million existing homes put on the market each year and the 1.5 million new homes, at $6,000–$8,000 per system, the potential market for home purchasers alone is $45–$54 billion per year, without including those homeowners who might wish to retrofit and keep their homes.

The solar energy industry is certainly not speculative, and the risks to SBA are minimal. Solar needs pump-priming, to be sure, but ERDA has demonstrated a clearly defined need and market for solar energy. The risks are easily determinable, especially if an SBA loan applicant is engaging in business of distributing and installing systems and components which meet federal standards. The federal government cannot freeze the development of emerging industry through miopic loan policies. If SBA takes the lead in providing the financial support for small business to enter the market on the local level, the trickle-up effect will be felt through the line of distribution to the manufacturer.

Solar technology is not in its infancy. As Congress Office of Technology Assessment reported last month, "solar equipment is technically capable of providing almost any kind of energy. . . . The major barrier to widespread use of onsite solar technology is its cost. . . . It is clear, however, that there is a market for some types of onsite solar equipment at today's prices." In fact, solar systems have been perfected to the point that they are cheap, reliable, and ready to install, but government and big industry have been carried away with overcomplicating solar equipment. The emphasis must be on marketing what we already have. The marketplace will lower the price and improve the designs of the systems, if there is only some impetus to getting solar off the ground and into the homes of millions of Americans. Accordingly, hand in hand with SBA loans and assistance to solar businesses, the American public must be able to afford, understand, and trust this relatively simple form of energy conservation. One way the American trust in the product will be assured is through federal standardization of solar apparatus. ASEA proposes to develop standards for review and promulgation by the Consumer Product Safety Commission, HUD, and the Bureau of Standards, through grants to the American Solar Energy Foundation. The ASEA seal will gain the respect of millions of Americans and the professions in the construction industry.

The solar industry will not be dominated by the industrial giants, but rather will be made up of hundreds of thousands of small businesses. Unlike the oil, gas, coal, and electrical industries, our industry's energy is from the sun for free, not the ground or the turbines powered by those fossil fuels. While there will be established firms in the manufacturing end as the industry develops, solar energy is uniquely designed to foster competition and innovation through involvement of small business. It has to be, Solar application is as geographically diffuse as the construction industry itself. They will be in a position to develop markets on the local level, and push financial institutions toward long-term mortgage financing for their products, if there is federal encouragement. With respect to large corporate giants, one final myth must be disposed of. The conventional wisdom holds that the oil companies and other energy and utility companies will be big in the solar industry. ASEA believes that is not so, and has excluded them from membership. It is clearly against the interest of a company selling energy to advance the sale of energy-saving devices. Further, those who sell fossil fuel are not geared to manufacture construction equipment and the hardware associated with solar energy.

The states must participate in this industry development. Through grants to the states and cities to license and enforce standards as to the small businesses across the country, the local homeowner will have a more direct link with the federal program to encourage solar use. For example, Minnesota has taken the lead in weatherization. Minnesota requires that a home meet a certain level of energy conservation, through insulation, and the like, before it may be sold. If solarization were added as a requirement throughout the states, there would be 8 million chances a year to rehabilitate energy-wasting structures, 8 million chances to finance solar systems and other energy-saving devices, and 8 million chances a year to allow small businesses to sell and innovate in this emerging industry.

II. SOLAR ENERGY AS A JOBS PROGRAM

ASEA is pleased to introduce a brand new topic into the voluminous and exhaustive current debate surrounding solar energy. Neither the Administration nor the Congress have focused upon the overwhelming potential for solar energy to provide a jobs program.

In addition to calling for this committee to enhance the ability of small business to participate in the solar energy industry, we urge this committee to initiate a program to create employment of the hard core, semi-skilled and unskilled workers. Solar energy offers a unique opportunity to create employment through an incentive program for these individuals. Some background of energy incentives helps to clarify the nature of this opportunity.

The traditional incentives offered by the government in the energy field may be grouped into five categories, none of which include employment. They are:

1. Taxation—e.g., oil depletion allowances, accelerated depreciation, deduction of intangible drilling costs and the like.
2. Controls—e.g., price regulations through regulatory agencies in exchange for certain monopolies in the marketplace.
3. Services—such as research and development nuclear energy through direct government research or subsidy of private research.
4. Subsidies—where the government simply pays for the energy from which others benefit. The Tennessee Valley Authority is a case in point.
5. Creation of government institutions which are assigned various energy tasks, such as the Bureau of Mines, Southeastern Power Administration, the Corps of Engineers, Office of Naval Petroleum and Oil Shale Resources, to name but a few.

Each of these traditional incentives is designed to assure that energy supply meets energy demand at a reasonable price. None of them, however, is geared towards creation of large sale, permanent employment of the hard core, unskilled or semi-skilled worker. The assumption behind these traditional incentives is that social and economic benefits generally will outweigh the cost of the incentives. In the energy field, however, these incentives if seen as a benefit to employment at all, are viewed only as an indirect windfall of the incentive offered. This need not be so with solar energy.

We have not sought employment as a goal of energy incentives because the technology of energy generally has been too complex to permit direct employment as a benefit. For example, one is hard pressed to see how incentives for the nuclear energy industry could readily be made to create employment to the unskilled or semi-skilled worker who really does not have the educational background or experience to assist in the development of nuclear energy. Thus, as a practical matter, direct employment of these hard core unemployed has not been a goal of federal incentive programs in the past.

Solar energy, however, does not offer technological barriers to direct benefits to the unemployed. Solar technology is simply. Solar heating and cooling systems are readily available and, assuming the passage of present tax incentives for solar heating and cooling, solar energy will soon be on the marketplace.

Solar is simple because existing systems are no more complex than conventional heating or air conditioning systems, which, under proper supervision, can be installed by those in the construction and other trades who are most often hard hit by cycles of unemployment. That is, while it might take years of highly sophisticated education to train one person capable of installing a single nuclear power plant, training for installation of solar equipment could be accomplished in a few weeks.

We hope that such training could enable a chronically unemployed, semi-skilled or unskilled worker to immediately and permanently become a tax revenue producing individual rather than a consumer of tax dollars.

It is our purpose to encourage this committee, working in conjunction with other Congressional committees, to develop a solar energy employment program. But why the urgency to act now?

Simply put, solar heating and cooling is just around the corner. As a consequence of the Solar Heating and Cooling Demonstration Act of 1974, we may expect large scale installation of solar heating and cooling systems in new housing construction and the retrofitting of existing housing by 1980. The U.S. Energy Research and Development Administration, working with the Department of Housing and Urban Development and other agencies has demonstrated that solar systems are both available and workable. Tax incentives being presently considered by Congress will offer the purchasers of a new home the dollar incentive to go solar. Additional incentives for insulation costs will provide further

opportunities for new employment in this area as well as in solar system installation.

How large is the market which will create this new employment?

There are six million existing homes transferred to new owners each year. There are from one to two million new homes built each year. These two events mark opportunities for the new homeowner or purchaser of an existing home to buy solar systems and to install insulation.

Somewhere between six to eight million systems could be installed each year for the next five to seven years, costing somewhere between five and eight thousand dollars per installation. Thus, the market for solar systems is somewhere in the range of 36 billion (six million units at $6,000 each) to 64 billion dollars (eight million units at $8,000 each) per year. Tapping only 10% figure is a desirable and achievable goal.

We must point out that this industry will be created primarily through the efforts of small businesses. Certainly existing industrial giants will manufacture solar systems and subsystems. But the G.E.'s, Revere's, Alcoa's, Owens Glass and others will not be installing them. The local builders, developers, plumbing, heating, and cooling contractors and nascent solar stores will be on the frontline of solar installations, carrying out their traditional function of selling and installing systems manufactured by others. We submit it is this cadre of small businesses that justifiably should and do receive this committee's attention.

It is difficult to estimate the employment potential in this new industry, but the potential is enormous, because the major cost of a solar installation or of insulation in a home is labor. More important, however, is that this labor need not be highly skilled, but many come from the hard core and cyclically unemployed.

Despite the tremendous market potential, solar energy and insulation programs cannot become a reality without a labor force adequate to meet the demand. Therefore, the small businesses which this committee serves need help in creating this new labor force.

We therefore urge your committee to develop legislation that offers the following employment incentives:

1. direct financial aid to small businesses for training programs in areas of hard core unemployment for solar heating and cooling projects as well as insulation projects;
2. long term capital loans given on a preferential basis to those small businesses engaging in either solar industry or in insulation;
3. development of technical programs and information resources to encourage builders and heating and cooling contractors to engage in installation of solar energy systems and insulation;
4. aid for employer sponsored training in technical schools in solar heating and cooling and energy conservation for newly hired employees;
5. special tax incentives for small businesses engaging in solar energy or energy conservation installations or programs.

In this way, we hope this committee will be first in recognizing the unique opportunity to create employment in the solar energy industry. Additionally, this committee might serve its traditional function of assuring small business a fair opportunity of participating in this new and exciting industry.

JOHN F. LILLARD.
G. JAMES FRICK.

MACHINERY AND ALLIED PRODUCTS INSTITUTE,
Washington, D.C., September 16, 1977.

THE PROPOSED "ENERGY TAX ACT OF 1977": TITLE II OF H.R. 8444 AS PASSED BY THE HOUSE OF REPRESENTATIVES

Hon. RUSSELL B. LONG,
Chairman, Committee on Finance, U.S. Senate,
Dirksen Senate Office Building,
Washington, D.C.

DEAR MR. CHAIRMAN: The Machinery and Allied Products Institute is pleased to have this opportunity to comment for the public record of the Senate Finance Committee on selected provisions of Title II of H.R. 8444 as passed by the House

of Representatives on August 5, 1977. The sections of proposed law in question are referred to in the bill as the "Energy Tax Act of 1977," Our views on tax aspects of H.R. 6831, from which H.R. 8444 evolved to its present state, were presented in the House of Representatives to the Committee on Ways and Means by letter of June 3, 1977.

As the Finance Committee may know, MAPI is the national organization of manufacturers of capital goods and allied equipment. Whether a national energy plan becomes law or not, MAPI's member companies will continue to be among the primary suppliers of equipment used to produce, distribute, and conserve energy in this country. Also, these companies are extensive energy users in their own right, and, of course, are major employers and taxpayers as well. Accordingly, we have a direct interest in the Committee's deliberations with respect to H.R. 8444.

To sum up our thinking about H.R. 8444 at the outset, we accept that government should take further action to deal with the dilemma of growing reliance on imported, increasingly scarce, fossil fuel resources. The implications of inaction in this area of public concern are such as to dictate that there be a "national energy plan." However, we disagree in part with the kind and extent of government intervention—over and above that which already is operative—which has been proposed by the Carter Administration and now is reflected in H.R. 8444.

More specifically, the essence of H.R. 8444 lies in the repression of energy consumption by means of massive new taxes and government controls. In our opinion, this country would benefit at this time from less rather than more interference by government in the markets for conventional energy resources. As we see it, the centerpiece for an effective national energy program should be the phased price decontrol of oil and natural gas, with resulting proceeds to go to producers for new exploration and other energy development. At the same time, if conditions are as critical as we are given to believe by the incumbent Administration, there should be further affirmative government programs of substantial proportion to stimulate private research and development in new energy technology.

The distinguished Chairman of the Committee has been reported as characterizing the Carter Administration's energy program—now largely reflected in the House-passed bill, H.R. 8444—as an "unmitigated disaster" on the production end. We concur, but would not necessarily limit the characterization to production aspects of the bill. In the tax area alone (i.e., Title II), H.R. 8444 would further complicate the Internal Revenue Code despite the public clamor for tax simplification. Also, the provisions in question would be very expensive to administer for both government and taxpayers alike. As if this were not enough to give the Committee pause, some of the items in Title II are unnecessary, unfair, or inequitable as among similarly situated taxpayers.

We note further that, at the "bottom line," Title II of H.R. 8444 would make sizable claims on the capital and other resources of the business sector of our economy. Meanwhile, government is planning other major initiatives in "tax reform," social security, welfare, and other areas of national interest without any clear present indications of coordination, notwithstanding that all the programs combined could divert business resources in large sums. If there must be piecemeal consideration of costly new government programs, we can only hope that the Committee will exercise its foresight to see that government does not end up making excessive and debilitating claims on taxpayers.

As to the "National Energy Plan" in particular, we are concerned that, in the absence of "major surgery" performed by the Senate on H.R. 8444, the bold and promising—but politically difficult—decisions might not be made in the current round of policy discussions. Specifically, notwithstanding the logic of "market" responses to the energy proglem and new, major government commitments of an affirmative kind to deal with energy supply, neither the Carter Administration nor the House Majority seem disposed to these approaches as compared to extensive new government controls. We sincerely hope that the Committee will rethink the energy proposals before it in concept as well as detail, and present the Senate with realistic alternatives.

The remainder of this letter consists of our further views on various sections of the proposed "Energy Tax Act of 1977."

COMMENTS ON SELECTED PROVISIONS OF TITLE II OF H.R. 8444

Our comments below are concerned with (1) the gas "guzzler" tax; (2) the repeal of the personal deduction for state gasoline taxes; (3) the extension of the excise tax on gasoline and other motor fuels; (4) the repeal of excise taxes

on buses, bus parts, and items used with certain buses; (5) the crude oil and natural gas liquids equalization tax and rebates; (6) the excise tax on business use of oil and natural gas, and related tax credits; (7) the business energy tax credit; (8) other investment tax credit and depreciation changes; and (9) oil and gas and geothermal energy exploration incentives.

Gas "guzzler" tax

As approved by the House, a gas "guzzler" tax would be imposed on each sale or initial lease by the manufacturer of an automobile that falls below efficiency standards established for each model year. The efficiency standard would increase for each model year 1979 through 1985, and start from 3 to 5.5 miles per gallon (mpg) below the fleet-wide average standards imposed under the Energy Policy and Conservation Act (EPCA). The tax would apply to automobiles weighing no more than 6,000 pounds; it does not apply to trucks with a cargo capacity of at least 1,000 pounds.

A separate tax table would apply to each model year 1979 through 1985, with the 1985 table to apply to later model years as well. The lowest tax would increase from $339 for an automobile with an efficiency rating of 15 mpg in 1979 to $397 for an automobile with an efficiency rating of 23.5 mpg in 1985 and later years. The highest tax in each model year would apply to vehicles with efficiency ratings at or below 12.5 or 13 mpg and increases from $553 in 1979 to $3,856 in 1985 and later years.

The guzzler tax also would apply to new and used imported cars, according to their model years, with the tax to be imposed on the importer. Further, the cost basis of any automobile subject to the guzzler tax would be reduced by the amount of the tax itself. Proceeds of the tax would be put into a trust fund to be used to retire the public debt.

Comment.—We object to the so-called gas guzzler tax, and we object even more strenuously to the outright banning of "fuel inefficient" cars recently approved by the Senate in S. 2057 in an attempt to preempt the guzzler tax. Although it is clear that automobiles in this country must be engineered to consume less fuel, Congress already has dictated the direction and pace of change in the Energy Policy and Conservation Act (EPCA) passed two years ago. As the Committee is aware, the EPCA provisions already are affecting the size and design of most new automobiles. Further, these existing EPCA laws are causing manufacturers to retool at considerable capital expense, which expense companies must try to pass along to consumers if they are to continue in operation.

In our opinion, Congress has given quite enough attention already to the American automobile, and there is no point in continuing to make of this one product and the industry, owners, and employees who depend on it a scapegoat for this nation's problems in the energy area. Also, we think it unfair to regulate motor vehicles so arbitrarily that the larger ones, for which there are legitimate purposes, no longer are available or affordable to the persons who need them. Indeed, when it is considered that new vehicles of the type which would be reached by the guzzler tax consume a relatively small proportion of the total amount of fuel used in this country, one might easily conclude that Congress is giving disproportionate attention to this one energy conservation target.

We should add that a new excise tax for fuel-inefficient cars would not be a welcome addition to the Internal Revenue Code. Nor is an outright ban on these cars necessary. The need for these provisions is questionable because the existing EPCA provisions and higher gasoline prices will bring about significant increases in automobile efficiency without further simulus of any kind. To the extent that a guzzler tax or ban would do that which is destined to happen in any event, there is little reason to have either one in the first instance, unless it is thought that industry should move at an even quicker pace than EPCA and market conditions now dictate. On that point, we do not feel that the pace being set by Congress in these proposals is prudent considering the limitations of manufacturers with respect to capital availability and competitive position.

As matters stand, it appears that joint conferees will have to choose between either a House-passed guzzler tax or a Senate-passed outright ban on fuel-inefficient cars. To some extent, this choice may be altered by the Committee's actions which—unthinkable as it may be—could yield a combination guzzler tax and outright ban on the Senate side. We do not favor any of these proposals, but would add that a tax in this context seems to us less objectionable than an outright ban.

State gasoline taxes

The House bill repeals the personal deduction for state and local government taxes imposed on the purchase of gasoline, diesel fuel, and other motor fuels used for nonbusiness purposes, effective for purchases after December 31, 1977.

Comment.—The proposal to repeal individuals' deductions for state gasoline taxes is one which, in our opinion, should not be offered in the context of omnibus energy legislation, if at all. Ostensibly, the deduction is taken up for repeal in this context because it lowers the cost of gasoline and encourages consumption whereas the purpose of other energy taxes which have been proposed is quite the opposite. In our opinion, the deduction in question is not a factor in decisions about the purchase of gasoline. Rather, it exists in the Code for much the same reason as other deductions for state taxes paid, in recognition of sovereign rights; competing claims for financing several levels of government; the burden to individuals of taxation by successive levels of government; etc.

Although we do not at this time take a position for or against the idea of striking this deduction, it seems to us that the proposal can only hurt individuals already confronted with federal, state, and local taxes at nearly confiscatory levels. In our judgment, any changes in this deduction might better be considered in the context of general tax revision. As the Committee is aware, there are some members of Congress who advocate wholesale elimination of itemized deductions as part of a larger scheme of income redistribution. They will get their hearing, and the state gasoline tax deduction should be put aside until then.

Gasoline tax extension

The current federal excise tax of $.04 a gallon on gasoline and other motor fuels would be continued at that rate through September 30, 1985 instead of being reduced to $.015 a gallon after September 30, 1979 as now scheduled. The House bill does not affect the current Highway Trust Fund, which will continue to receive these funds under present law through September 30, 1979.

Comment.—We concur in the House decision on this issue and hope that the Committee will agree. In our opinion, gasoline taxes of the type which were offered by the Carter Administration and discussed in the House of Representatives should not be enacted.

Specifically, we see nothing but trouble with a graduated gasoline tax geared to total demand because it would be insensitive to individual needs and lead to hardship in many instances. Similarly, we see no constructive purpose being served by small increases in the existing gasoline tax. Personal experience alone leads us to think that the demand for gasoline is much more inelastic than the proponents of gasoline taxes believe. If individuals are not in a position to reduce their gasoline consumption to any significant degree, small tax increases will have no appreciable effect and large tax increases will simply work a hardship on those least able to pay.

Those in Congress who have heard from their constituents on this subject know that, by and large, the public has come to the same conclusion.

Excise tax on buses

Under the House bill, the 10 percent excise tax on buses and the 8 percent excise tax on bus parts and accessories would be repealed. Parts and accessories that may be interchangeable between trucks and buses would be taxed on sale unless the purchaser could provide the manufacturer with an exemption certificate indicating bus use. If tax-paid parts were to be acquired from a dealer and be used on a bus, a credit or refund would be available.

Also, the House bill removes the excise taxes on tires, inner tubes, tread rubber, and lubricating oil sold for use in connection with privately owned intercity, local, and school buses. It also provides a credit or refund for the taxes imposed on gasoline and other motor fuels to the extent the fuels are used in qualified operations of privately owned intercity, local, and school buses.

Comment.—We concur in this proposal to repeal the excise tax on buses and related parts, tires, lubricating oil, fuel, etc. Naturally, we would not maintain that, at current levels, the existing tax has "discouraged" mass transportation. Nor do we think that repeal would "encourage" such transportation or increase bus ridership in particular. On the other hand, the tax obviously adds to the costs of vehicles, which must be borne in some way by privately owned bus transportation companies, their owners, employees, and riders.

Buses already contribute significantly to the national energy conservation effort, and ridership can be expected to increase as fuel prices rise. Accordingly, we think

it is consistent with national policy favoring mass transportation as an element of the conservation effort to remove the excise tax in question and do so now.

Equalization taxes

Under the House bill, an excise tax would be imposed on the first purchase of price controlled, domestically produced crude oil. The tax would increase the cost of all crude oil to the world price by 1980. The termination date of the tax would be September 30, 1981.

This tax would be imposed in three stages. In 1978, the tax would be applied to lower-tier oil and be equal to one-half the difference between the controlled price of new oil and the controlled price of old oil of the same classification. In 1979, the tax on lower-tier oil would be raised so that the cost would be identical for lower-tier and upper-tier oil of the same classification. In 1980 and for the duration of the tax, the tax would equal the difference between the wellhead prices of uncontrolled and controlled crude oil of the same type. In other words, the price of controlled oil plus the tax would be raised to the world price of oil in 1980. Certain limited exemptions would apply.

Further, a tax would be levied on sales to end users of natural gas liquids, and it would be based upon the difference between the controlled price of the liquid and the wholesale price for No. 2 distillate oil in the region, adjusted for differences in Btu content. This tax would be equal to one-third of the difference in question in 1978, two-thirds of the difference in 1979, and equal to the entire difference in 1980 and later years. Exemptions would apply for liquids used in residences, on farms and in churches, and in schools and hospitals.

Under certain given circumstances, the President could suspend any or all of the equalization taxes subject to a veto by either House of Congress.

The net receipts from the equalization taxes would be returned to each taxpayer in 1978 through a new tax credit. Also, special payments would be made in 1979 to adults who are recipients of monthly benefits under social security, railroad retirement, or supplemental security income.

An exception to the crude oil equalization tax would be provided for heating oil used in residences, churches, schools, universities, and hospitals, with distributors of heating oil to receive a refund of the tax for amounts sold to such users and to pass the refund through to those customers as lower prices.

Comment.—The crude oil and other equalization taxes, along with related price control provisions, are said to be the backbone of the Carter Administration's proposed national energy plan. If enacted, the cost of affected energy resources would rise to world market prices and this would be reflected in the price of all kinds of goods and services. Presumably, this cost increase—along with the inflation and uncertainty which accompany it—would induce more energy conservation, which is generally accepted as a desirable if not necessary result.

In permitting the cost of energy to rise to market levels, the Administration and Congress would, in our judgment, be moving in the right direction. However, we would prefer that profits generated by the price rise be permitted to flow to producers. As we have often noted, a little faith in the market will go a long way at minimum cost. The equalization taxes and rebates, for so long as they are in effect, would prevent the energy markets from working efficiently to allocate resources, and we have reservations about the proposal for that reason.

If the taxes and rebates are in fact necessary to cushion the impact of transition to world market prices and if the mechanism will in fact work to that end, then we can abide with it for the brief life presently assigned. However, the Committee should review with care the efficacy of the proposal for the intended purpose. Also, we recommend that the Committee consider such alternative approaches as price decontrol coupled with plowback requirements for energy producers. In the final analysis, we believe that energy production would best be enhanced by government disengagement from energy markets, and we urge the Committee to keep that goal in sight as it evaluates the options presented to it.

User taxes

The House bill would impose a tax on the use of oil or natural gas as fuel in a trade or business. Three levels of tax would be imposed, as follows: Tier 1, which would apply to an industrial use where conservation of fuel consumption is feasible; Tier 2 which would apply to uses of oil or natural gas in which conversion to another fuel is feasible; and Tier 3 which would apply to electric utilities, industrial producers of electricity using boilers with a total rating of at least 100 megawatts per plant, and industrial cogenerating facilities.

An exemption would be provided to limit the tax only to those firms which use more than 50,000 barrels of oil per year or the Btu equivalent of gas (i.e., 300 billion Btus). Also, in cases of regional competitive disadvantage, the Treasury Secretary could provide additional exempt amounts for individual plants.

The amounts of tax in question and special rules for determining them are set forth in the House bill. Beginning in 1981, the tax rates would be adjused annually for inflation that occurs after 1979, using the Gross National Product implicit price deflator in a prescribed way.

The President could suspend this tax for a period of up to one year on grounds of adverse economic effect, subject to congressional veto. Also, the Treasury Secretary would establish a procedure for reclassifying fuel uses to lower-taxed or exempt categories.

Among the several exemptions from the user tax is one for industrial process use where the use of fuels other than oil or natural gas would materially or adversely affect the manufacturing process or the quality of the manufactured goods, and when the use would not be economically or environmentally feasible. Another of the several exemptions would apply in the case of oil and natural gas used in a facility that was in existence or under construction on April 20, 1977, and which was precluded from using coal by air pollution regulations then in effect.

Further under the House bill, a taxpayer could elect a credit against the user tax of $1 for each dollar of qualified investment up to 100 percent of the taxpayer's oil and natural gas use taxes. The qualified investment is described in the bill as "alternative energy property" placed in service during the year. This property would include such things as a boiler whose primary fuel is an alternate substance; equipment used in the production of energy by nuclear, hydroelectric, or geothermal power, with some exceptions; equipment for converting an alternate substance into synthetic gas; and certain related pollution control facilities, auxiliary equipment, and planning costs.

Comment.—We oppose the oil and natural gas users' penalty tax because, like much of the proposed Energy Tax Act of 1977, it is unnecessary and would impose an undesirable new regulatory burden on business. As already indicated elsewhere in this letter, it is now clear that energy policy is moving in the direction of market pricing for oil and natural gas. In the face of higher prices for these fuels, energy users who are able to do so can be expected to conserve more than at present and, eventually, to convert to alternative fuels that become more economical relative to oil and natural gas. For example, we are confident that when oil and natural gas are priced at replacement cost, major fuel burning installations will increasingly use coal without government requiring that they do so. Furthermore, we can expect the market to adjust as quickly as supply and demand conditions allow.

In contrast, if government intervenes to force the pace by artificially padding the price of fuel with excise taxes, the results will be unsatisfactory. First, there is, in our opinion, no way that the tax can be made to fall equitably on similarly situated taxpayers without a legion of new government and industry personnel to administer it. Even then, there would be endless haggling over fuel use classifications, exemptions, and eligibility for credits. Also, complications resulting from the tax would add to the uncertainty about tax and energy policy which already interferes with business planning. Frankly, we rather suspect that some of the oil and natural gas "savings" attributable to the user tax would stem from discontinued business operations.

On a second point, it is at least questionable whether a penalty-type user tax should be imposed to "encourage" conversion to alternative fuels when there is serious doubt that the producers and distributors of such fuels, such as coal, have enough capacity to meet the targeted conversion objectives. As we understand it, the General Accounting Office, the Office of Technology Assessment, and the Congressional Research Service of the Library of Congress all have expressed doubt that the facilities of production and distribution of coal will be able to meet the needs of energy users, as artificially stimulated by H.R. 8444. Rather than induce conditions which lead to still more shortages and to inflated prices for alternate fuels, government should do nothing at all through user taxes to interfere with the supply and demand for alternate fuels.

Assuming for the moment that the user tax will be retained in H.R. 8444, we suggest that further attention be given to the exemptions. For example, as to the threshold for taxation—whether it be 50,000 barrels of oil or some other amount—the Committee should inquire whether an exemption might not be more prac-

ticable and/or more equitable on a plant-by-plant rather than a per company basis. Also, since the real purpose of the penalty levy is to induce conversion to alternate fuels, the Committee should consider reinstating the exemption, which the House removed in floor action, for users exempted from coal conversion under other provisions of the energy legislation. Further, the bill should have some provision authorizing the Treasury Secretary to grant relief in situations of competitive disadvantage or other undue hardship resulting from unintended application of the user tax, without reference to regional considerations.

Although we fully expect this exemption process to be an administrative morass, such a process seems necessary if there is to be a user tax of the type proposed in H.R. 8444.

Business energy credit

The House bill would allow a 10 percent business energy tax credit in addition to the investment credit provided under present law for investments by business in qualified property intended to reduce the amounts of oil, natural gas, or other energy consumed in heating or cooling a building or used in an industrial process. The credit would be available for investments in qualifying property made after April 19, 1977 and before January 1, 1983.

Where such a credit is generated by investments in "alternative energy property" (described in summary terms earlier) it could be applied against 100 percent of the taxpayer's income tax liability, rather than pursuant to the 50 percent limitation now generally available. The credit would be available in this case as an option to the user tax credit for taxpayers liable for the oil and natural gas user tax. A taxpayer who elected the credit against the use tax would receive the regular investment credit only on the amount of investment not credited against the user tax.

Qualifying property in the case of the business energy tax credit would include, in addition to alternative energy property, the following: (1) cogeneration property installed in an existing facility; (2) advanced technology propery to use solar, geothermal, or wind energy for heating, cooling, or electricity; (3) specified items of equipment to recover waste heat and gases or otherwise reduce energy consumption; and (4) certain equipment used in recycling solid waste.

In order to qualify, eligible property or equipment would have to be new property used in connection with a building or facility in existence or substantially completed by April 20, 1977, except for alternative energy property and recycling equipment.

Comment.—In a national energy plan so thoroughly encrusted with the dead weight of costly new government controls, it is a pleasure to see that Congress would yield some tax revenues for a worthy cause. In our judgment, the public at large has benefited in past years from the economies of business production using relatively inexpensive fuels. Now that many businesses would be asked to convert, at major expense, to alternate fuels, it is altogether fitting that the public share some of the cost. Indeed, one wonders, in view of the forced pace and the Administration's refusal to compromise on environmental goals, whether government's participation through an additional 10 percent tax credit is nearly enough.

On several matters of detail, the Committee should consider alternative forms of relief to complement the credit in instances where a taxpayer has a qualifying expenditure but has neither a user tax to offset nor tax liabilities to credit. On a related point, we do not see why the business energy tax credit, other than for alternative energy property and recycling equipment, is to apply only to energy property used in connection with a building or industrial process in existence on April 20, 1977. If the tax credit is a desirable provision to relieve taxpayers somewhat of energy conservation and conversion expenditures, then it would seem that it should also apply for additions to newer property. Turning to another item, we concur in application of the credit to recycling installations and hope that the credit will result in bringing more such facilities on stream. This use of the credit has appeal on grounds of environmental as well as energy policy.

Other investment credit and depreciation changes

Among other investment credit and depreciation changes proposed in the House bill are several which would reduce existing benefits. For example, the regular investment credit would be denied for portable air conditioners and heaters on grounds that they "tend to use energy inefficiently." Also, the investment credit and rapid depreciation under accelerated methods and shortened

useful lives would be denied for new oil and gas boilers and other oil and gas combustors placed in service after June 20, 1977 where (1) the taxpayer is not prevented by state or federal air pollution regulations from burning coal as a fuel, and (2) where this use of oil or natural gas is not an exempt use for purposes of the oil and natural gas use tax.

Comment.—Although we do not feel strongly about this proposal to remove existing tax incentives to equipment purchase, they seem petty and smack of overkill. Obviously, there are some taxpayers who will find it less expensive to use portable air conditioners and heaters than to install and operate central units, and they may be saving energy as a result. Also, there will be cases where it is out of the question for a taxpayer to acquire other than an oil or natural gas combustor, or where he placed one in service after June 20, 1977 without being able to alter a plan of action begun earlier when the so-called national energy program was not known to the public.

These are not reasons for Congress to deny affected taxpayers the capital recovery they expected and should receive. Accordingly, we would drop these negative items.

Oil, gas and geothermal

Under the House bill, a current deduction would be allowed for intangible drilling costs related to the exploration and development of geothermal resources. To the extent that these intangible drilling costs exceed the taxpayer's income from the production of geothermal resources, the costs would be subject to the minimum tax on preference items. In addition, the bill provides percentage depletion at a 10 percent rate for all geothermal resources, subject to a basis limitation.

Further, the House bill extends to future years an existing provision, applicable for 1977, whereby the minimum tax on preference items applicable to intangible drilling costs for oil and gas wells is modified to treat these costs as preference items only to the extent they exceed the taxpayer's oil and gas production income.

Comment.—These evidently are the production stimulus sections of H.R. 8444, at least in terms of tax "concessions" aimed at energy supply, and they are slim pickings in our opinion. Indeed, they are much slimmer than they might otherwise be because of the minimum tax. We raise this issue not to begrudge anyone the relatively small amounts which are implicit in these sections, but rather to spotlight the failure of the House to commit more resources to energy supply. The point is that the House has produced a "mouse" on the production end of its national energy program, and the provisions here in question dramatize the imbalance of the program when compared to the relatively severe conservation aspects.

Further, a word is in order about the minimum tax. As in many other contexts, the minimum tax here is moving at cross-purposes to the important tax item appended to it. One would think that if the drilling activity in question is important enough to allow a tax concession in the form of a current deduction, then the Congress should not first grant the deduction and then, in the same gesture, partially withdraw the benefit by levying another tax on the "preference" so conferred. In our opinion, the minimum tax both complicates the federal income tax law and works against tax policy otherwise established to favor activity which is in the national interest.

We are hopeful that the minimum tax eventually will be repealed without prejudice to other existing sections of the tax law which ease the tax burden on savings and investment, and we urge that the Committee consider taking that action when general tax revision is placed on the docket.

CONCLUDING COMMENT

In presenting these views, we repeat that we understand the importance of having a national energy plan and agree that it should promote conservation. However, we do not feel that such a plan, under current circumstances, requires that government move in and control private decisions and markets with respect to energy. In fact, it is clear that if government will reduce its presence in energy markets and allow prices to rise to unregulated levels, then more conservation will be induced. Moreover, people acting voluntarily will lower their energy consumption as quickly as their individual circumstances permit. Of course, government must intervene in the case of shortages and economic

dislocations. Still, this kind of intervention can be temporary and/or limited in scope, and the Internal Revenue Code surely need not be put to such unaccustomed uses as are envisioned by parts of H.R. 8444.

As for energy production, we again see useful forces—namely, more private initiative—being put in motion by price increases, which are inevitable if government will only stop resisting them. Regarding H.R. 8444, we find it paradoxical that the Carter Administration, with its very bleak energy prognosis, and the House of Representatives could find no room in their proposals for a strong new commitment by government to increased conventional or alternate energy supplies. If the energy problem is a national one, is both current and long-range in its time frame, and is as deadly serious as we have been told, then why is H.R. 8444 an "unmitigated disaster"—in the Chairman's words—on the production end? In paring back the cost-ineffective government controls in H.R. 8444, we trust that the Senate will introduce into its version of the legislation substantial affirmative programs for energy supply.

We appreciate having this opportunity to offer our thoughts to the Committee concerning the proposed Energy Tax Act of 1977.

Respectfully,

CHARLES STUART,
President.

STATEMENT OF JOHN J. SIMPSON, SENIOR PETROLEUM ECONOMIST, CITIBANK, N.A., NEW YORK, N.Y.

This omnibus energy bill is intended to provide a program to ease our national energy problem in the years ahead. But the bill's one-sided emphasis on conservation has already caused Citibank to express its dismay. Conservation alone can mitigate, but not eliminate, the energy shortages anticipated in the coming decade.

Our appraisal of the bill as set forth in Citibank's Energy Newsletter, was that it provided "an unbalanced program—biased toward the conservation or demand side of the equation but short on the incentive or supply side". Fortunately, it is not too late to rectify this basic shortcoming of the bill being considered.

What really is needed is a balanced program that induces energy conservation while encouraging the industry either to explore for new fields or to invest in techniques that will step up output from existing, though run-down, producing fields. The bill's oil pricing and taxation concept will not accomplish this, since—as our Newsletter pointed out—it "is incompatible with the industry's investment needs and out of phase with its spending patterns".

The bill would, in time, allow newly-discovered oil to be priced at market levels but "the cost of finding such oil must come out of current income. And it appears that this income will continue to be limited by the equalization tax provisions of the legislation, which will recycle to consumers . . . revenue from price increases on lower-tier oil, while making no provisions for using any of the revenue raised to finance exploratory drilling."

Of concern, too, is the failure of this energy bill to make some provision for expanding our domestic r efinery facilities even though these facilities have been forced occasionally to operate at exceptionally high levels—close to 95% of capacity in some weeks—to meet domestic product calls. This shortcoming of the bill will, therefore, increase further—rather than lessen—this country's need to rely on foreign oil sources.

And the bill's negative bias is not limited to the oil sector. It also legislates a top price for natural gas that is not the equivalent of the world price of crude oil, but which is related on a BTU basis to the controlled average price of domestic crude oil. An industry that had been anticipating deregulation of natural gas prices—and had made plans accordingly—is now faced with an incentive-killing price rollback in the hitherto unregulated intrastate markets of the major gas producing states. This bill, by legislating continuing gas price controls and price rollbacks, will bring about a further curtailment of domestic supplies which will increase the need for high-priced gas imports—costing upwards of $3.00 per MCF—that will add to our already large trade deficits and thus compound our balance of payments problem.

The aspects of the National Energy Act that we believe will so negatively impact the industry's ability to increase supplies of conventional oil and gas are not

even offset by any major provisions for increasing supplies of alternative sources of energy. Although billions of dollars will flow into the Federal Treasury from the various taxes levied by this omnibus energy bill, the national energy effort is not to be a major beneficiary as these funds are recycled.

To its credit, this omnibus bill does provide an important role in the national energy plan for coal, our most abundant conventional energy resource. But there is some concensus that continuing labor, environmental, and transportation problems will make it difficult for the coal industry to meet long-term goals.

We are concerned, on the other hand, about the failure of the bill to provide for the expansion of nuclear power which necessarily must play an important role in the future energy picture. This failure is particularly unfortunate in view of the long lead time that is needed to bring new nuclear capability on line. Brushing all the danger myths, misconceptions and misinformation aside, we are convinced that nuclear power is the real solution to the long-term U.S. energy need.

Unless a sound long-range and balanced energy plan is substituted for that now being implemented, there is a grave danger that the effort to bring equilibrium to the U.S. energy situation will fail with serious implications for our economic health and national security as well as our international prestige.

On the other hand, phase decontrol of energy prices should encourage the search for new oil and gas reserves. The conservation ethic would be stimulated among consumers. Impetus would be given to the development of alternative forms of energy.

Statement of the American Bakers Association

Mr. Chairman and members of the committee, my name is Ernest B. Hueter. I am Vice Chairman of the Interstate Brands Corporation of Kansas City, Missouri, and Chairman of the American Bakers Association Energy Task Force. I am speaking on behalf of the wholesale baking industry and the American Bakers Association. The American Bakers Association includes in its membership, bakers who produce about 80% of the commercially baked bread and other bakery products distributed to grocery stores, restaurants, and institutions.

We, as bakers, applaud the President's energy proposals, and support the program in principle. However, we are here today with some suggestions that we think will improve and strengthen it.

We want to direct our testimony today to Title II, the tax provisions of S. 1472.

Our first comment relates to the standby gasoline tax set forth in section 1221. We do not believe that the tax, as proposed, would produce sufficient conservation to justify its inflationary economic impact. A far more effective means of encouraging conservation would be to provide tax incentives for industrial fleet conversion from gasoline to diesel fuel. Attached to our testimony is an amendment to accomplish this. It would yield substantial gasoline savings.

For example, the baking industry operates about 125,000 gasoline burning delivery trucks, each running approximately 20,000 miles per year and getting about 8 miles per gallon. That adds up to about 325 million gallons of gas a year. Experiments made by our ABA Transportation Subcommittee indicate that if the same 125,000 trucks were converted to diesel fuel the miles per gallon would increase to 16, saving between 100 and 150 million gallons of fuel a year, for the baking industry alone. As a result of our tests, a few conversions are now taking place, but adequate tax incentives would speed the process.

The industrial end users tax is understood to be designed as a further incentive to force conversion to coal. As such, the tax should apply when conversion is clearly possible, for example, for boiler fuel for steam generation in large industrial and utility boilers. There is no reasonable conversion potential for the baking industry.

Over 90 percent of all the commercial bread ovens in the United States are direct-fired gas ovens, for which there is no feasible substitute. Any future conversion to alternate fuels would require no less than 30 percent energy to bake the same loaf of bread. The cost and practicality of nationwide conversion would be prohibitive, and would cause an unwarranted and unjustified financial hardship on the consumer.

While we are not objecting to the industrial end users tax, if there is to be an exemption for some agricultural uses, as is now included in section 4993(b)(3), this exemption should be expanded to include all essential applications of natural

gas for food processing and packaging. Attached to our testimony is a copy of an amendment adopted by the House which will achieve this result. We hope you will favorably consider it.

The food chain is a continuous process from farmer to consumer. It would be unfair and discriminatory for one segment of the food industry to have an exemption from this tax, which is not shared by others of the food industry. Bread and other foods are vital to the health of the American people.

We believe the Business Energy Tax Credit Provisions, part C of the bill, are too narrow and restrictive. The House agreed and amended the bill to provide greater incentives for energy conservation and conversion. We urge you to adopt these amendments with two additional provisions:

First, the "principal purpose" test proposed in section 1301(b), section (48)(1)(1)(D) of the Code, is unduly limited. It could be interpreted to deny this credit to property which has an important energy saving effect, but where that is not its principal purpose.

Second, the list of potential business energy property contained in section 1301(b), section 48(l)(7) of the Code, might be construed to exclude other property designed to conserve energy, and which should rightfully be included here.

Mr. Chairman and members of the committee, we basically support the President's program. But we believe that our proposals will make it more effective and equitable. We hope you will consider them favorably.

Mr. Chairman, this amendment appears on page 434, beginning with line 12, of H.R. 8444. It was offered by Congressman Martin in Committee and subsequently passed by the House Ways and Means Committee. Discussion of the amendment appears on pages 101 and 102 of the Committee Report. The amendment was approved by the House as subsection 4992(b)(1)(F).

The purpose of this amendment is to provide an exemption from the excise tax on business use of oil and natural gas where the fuel used is an integral and essential part of the manufacturing process itself.

The oil and gas consumption taxes are designed to encourage conversion and conservation in connection with process uses where the process involved could be performed correctly and economically with the use of some other fuel. However, there are other instances where the nature of the manufaeturing process is such that there is no reasonable substitute for oil and natural gas. Use of an alternate fuel where a clean, steady, even flame is essential to the process could adversely affect the end product, making it less desirable for the consumer.

The determination of which process uses are covered by this exemption is to be made by the Secretary on a use-by-use basis. In determining these use-by-use exemptions, the Secretary is to examine, for each process use, whether a fuel other than oil or natural gas could be used in a manner which satisfies the following criteria: 1) the substitute fuel would not have a material adverse effect on the manufacturing process or the quality of the manufactured goods, and 2) the use of such substitute fuel is economically and environmentally feasible. The substitute fuels to be considered would depend on the nature of the processes and on the technology which is available at the time of the determination. The most common fuel which would be evaluated as a possible substitute would be coal and its derivatives, but in particular situations substituting the use of fuels other than coal might be practical.

H.R. 8444 already recognizes the need for the exemption of certain business uses of oil and gas from the excise tax in subsections 4992(b)(1)(A)-(E). Inclusion of the additional subsection 4992(b)(1)(F) is consistent with the rationale of the section.

Mr. Chairman, I urge the retention of this amendment by the Committee.

"(F) any exempt process use (within the meaning of paragraph (2)).

"(2) EXEMPT PROCESS USE DEFINED—For purposes of this subsection, the term 'exempt process use' means the use of oil or natural gas in any manufacturing process where there is no substitute fuel—

"(A) which may be used without materially and adversely affecting the manufacturing process or the quality of the manufactured goods, and

"(B) the use of which is economically and environmentally feasible.

Such term does not include any use in a boiler or in a turbine or other internal combustion engine. For purposes of this paragraph, the term 'substitute fuel' means any fuel other than oil and natural gas.

EXPLANATION

Mr. Chairman, the purpose of this amendment is to encourage the conservation of petroleum products by expanding the investment tax credit for purchase of medium weight diesel-powered delivery trucks and for retrofit of existing gasoline powered vehicles.

The current investment tax credit is inadequate for this purpose because the useful life of this property is 5–7 years at most. Accordingly, in most instances the property does not qualify for the full tax credit. The amendment will remedy this defect by allowing the full credit if the unit has a useful life of 5 years or more and 50 percent of the credit if it has a useful life of 3–5 years.

During his testimony before the House Ways & Means Committee, Treasury Secretary Blumenthal pointed out that diesel fuel is a much more efficient use of energy than is gasoline. Industry experience bears this out. For example, the baking industry operates about 125,000 gasoline-powered delivery trucks, each running approximately 20,000 miles per year and getting about 8 miles per gallon. That adds up to about 325 million gallons of gas a year. Experiments made by bakers indicate that if the same 125,000 trucks were converted to diesel fuel, the miles per gallon would increase to 16, saving between 100–150 million gallons of fuel a year, for the baking industry alone. Multiply this by the million and a half trucks in this category and the conservation would be truly significant.

It has been argued that the fuel saving from diesel use is sufficient incentive to promote conversion. This is not true. Diesel engines and trucks cost about 30 percent more than comparable gasoline powered vehicles. This amounts to $3500–$5000 per unit. For a small business with 10–20 delivery type trucks, the capital cost of fleet conversion will be comparatively large. It would take longer than the useful life of the equipment to recapture the cost. Accordingly, the fuel savings alone are an inadequate conversion incentive.

This amendment will have a second important benefit. It will stimulate the production of medium weight diesel trucks and engines. Presently there are only two domestics manufacturers of this equipment. Last year 224,000 trucks in this category were sold, but only 18 percent were diesel powered. However, some American manufacturers such as GM have indicated that they will produce this type of diesel engines and trucks, and others are considering such manufacture. Thus there is a substantial potential for the creation of new jobs for American workers in this amendment.

Mr. Chairman, this amendment will have a dual benefit to our nation. It will help us save energy and it will help create new jobs. I move the adoption of this amendment.

AMENDMENT

On Page 482, after line 14, insert the following new subsection 2061(h):

"Section 46(c) is amended by adding the following new sections (6) and (7).

(6) Applicable percentage in the case of medium weight, diesel-powered transportation vehicles—notwithstanding subsection (c)(2), in the case of new vehicles

(A) which have a gross vehicular weight rating equal to or greater than 10,000 pounds and equal to or less than 26,000 pounds,

(B) which are used in furnishing transportation services, and

(C) which are powered by diesel engines, the applicable percentage for purposes of applying paragraph (1) shall be determined under the following table

If the useful life is—	The applicable percentage is—
3 years or more but less than 5 years	50
5 years or more	100

(7) Applicable percentage in the case of amounts expended in retrofitting medium weight motor vehicles with diesel engines—Notwithstanding subsection (c)(2), the applicable percentage for purposes of applying paragraph (1) to amounts expended in retrofitting gasoline-powered motor vehicles with diesel engines shall be determined under the table set forth in paragraph (6).

(8) Limitation on applicability of paragraphs (6) and (7)—Paragraphs (6) and (7) respectively shall not be effective unless the domestic manufacturing capacities, as determined by the Secretary, are adequate to substantially meet the demand for diesel-powered vehicles of the type described in paragraph (6), and for diesel engines necessary for the retrofitting described in paragraph (7).

AMENDMENT

On Page 472, line 22, in Section 2061(b)(5), strike "the principal purpose" and insert "a principal purpose."

EXPLANATION

Industrial and commercial property is purchased and installed for a number of business reasons: base costs, soundness and durability of the equipment, savings available through depreciation and/or amortization, resale value, and today, fuel efficiency.

As fuel costs increase, energy savings and energy conservation will play a large role in the property purchasing decision. A tax incentive for the purchase of such equipment would provide additional impetus to installation of fuel-efficient property. Thus, while neither energy savings nor a tax incentive will ever be "the principal purpose" for the purchase of most industrial and commercial property, together they would often be the motivating factor for purchasing fuel efficient equipment.

Therefore, the Secretary should be allowed by regulation to specify property which would be purchased should "a principal purpose" be energy reduction, even though "the principal purpose" may include a number of other business decisions.

For example, should a medium-sized restaurant wish to install a new, fuel efficient dishwasher, "the principal purpose" of the new property would be to wash dishes. "A principal purpose" of the purchasing decision, however, would be energy savings, and the tax incentive may tip the balance in favor of buying the new property.

SUGGESTED COMMITTEE REPORT LANGUAGE

The Committee intends that "a principal purpose" of property specified by the Secretary pursuant to section 2061(b)(5)(L) be the conservation of energy and that new property installed for the purpose of conserving energy be eligible for the tax credit pursuant to regulations promulgated under section 2061(a).

STATEMENT OF RANDOLPH J. SEIFERT, VICE PRESIDENT AND GENERAL COUNSEL, NATIONAL HOME IMPROVEMENT COUNCIL, INC.

This statement of the National Home Improvement Council is in support of the tax credit feature of S. 1472 which would offer a refundable tax credit to the homeowner for certain specified energy conserving home improvements.

The National Home Improvement Council is the trade association of the home improvement and remodeling industry bringing together 46 of the leading national firms, trade associations, and publications concerned with home improvement; and 1700 of the leading home improvement contractors, lending institutions and public utilities in 27 local chapters from Boston, New York and Washington in the East to Seattle, San Francisco and Los Angeles in the West.

The American homeowner has been beset by rising expenditures on all sides—increased taxes, maintenance costs, fuel costs and the myriad of related costs attached to home ownership. An incentive, such as an income tax credit as proposed by the Administration, would serve as a very real impetus to encourage those additional expenses necessary to bring about a substantial saving in energy consumption.

This organization believes that the American homeowner must become a part of the conservation program in order for it to be successful. Encouragement offered through a tax incentive appears to be the most practical way to involve everyone in the energy program, whether the retrofit work is contracted or is a do-it-yourself project.

The NHIC has long supported some form of tax incentive to the homeowner as being in the public interest. This present bill would go far toward realizing a substantial savings in energy utilization. It would furnish necessary help and an

incentive to the homeowner to more promptly meet the country's stated conservation goals. More than 40 million single-family owner-occupied homes would receive that impetus to action which could go a long way toward much improved domestic energy posture.

One brief comment on the utility orientation of the proposed energy program. The NHIC questions the role of a public utility actively engaged in the contracting and financing business. It is our belief that the traditional business economy is equipped and ready to handle the job at hand. However, if utilities must be involved, we would strongly recommend that their role be to work with the professional contracting and banking community as the coordinator to provide the installation and finance services to the consumer.

AMERICAN FROZEN FOOD INSTITUTE,
Washington, D.C., September 15, 1977.

Hon. RUSSELL B. LONG,
Chairman, Senate Finance Committee,
Dirksen Senate Office Building,
Washington, D.C.

DEAR SENATOR LONG: The American Frozen Food Institute (AFFI) is a nonprofit organization of manufacturers of frozen foods. AFFI is the national trade association which represents the processors of more than 90 percent of the frozen fruits and vegetables marketed annually in the United States as well as approximately 80 percent of prepared and other types of frozen foods.

The following are our comments regarding the proposed amendments to Title III, Part E, of S. 1472, the oil and natural gas users tax.

As processors of a major portion of this country's frozen foods, we believe the industrial user tax will have a detrimental effect on the food industry which provides an essential and nondiscretionary product to consumers. The proclaimed intent of raising the price of energy is to force conversion. But already the increases in costs of oil and natural gas have forced food processors to seek stringent conservation in order to control costs, and a substantial part of the frozen food industry will be unable to convert to coal anyway. Thus, the users tax, if applied to the food processing industry, will achieve no practical end except to raise the price of food and thereby disproportionately and adversely effect those who can least afford it.

To this end, the American Frozen Food Institute supports the Statement of the National Canners Association Before the Committee on Finance of the United States Senate on September 14, 1977, on the Excise Tax on Business Use of Oil and Natural Gas. We also fully support an amendment to Title II Part E, of S. 1472, which would make "agricultural production, processing and distribution" and exempt use under the excise tax provision of the legislation.

We respectfully request that this letter be made part of the Hearing Record on these provisions presently being considered by the Senate Finance Committee. Thank you very much for your attention to our views, and we would be happy to respond to any questions you may have.

Sincerely,

THOMAS B. HOUSE,
President.

AIR MASTER CORP.,
Cornwells Heights, Pa., September 13, 1977.

The SENATE FINANCE COMMITTEE,
Dirksen Senate Office Building,
Washington, D.C.
Attn: Michael Stern, Staff Director

GENTLEMEN: I was a manufacturer of storm windows and storm doors from 1947 until 1968. I now manufacture a full line of Prime Replacement Windows and Thermal Insulated Doors. I believe the best way to solve the problem of energy losses of old loose fitting wood, steel and aluminum windows and doors is to replace them with new double or triple insulated glass windows and thermal insulated doors. Storm products are a good way but not the best way to conserve energy.

In order for you to consider adding the above products to the list on the House Version HR 8444 I am enclosing some data for your evaluation.

I have spent 30 years as a manufacturer of windows and doors and I will come to Washington at the convenience of the committee if further evidence is needed.

Sincerely,

HAROLD L. KAPP, *President.*

Enclosures.

ARCHITECTURAL TESTING, INC.,
York, Pa., May 21, 1977.

Client: Air Master Corp.
Address: 1211 Ford Road, Box 406, Cornwells Heights, Pa. 19020. Attention: Mr. Harold Kapp.
Specimen tested: DH-A2-HP (50).

The following tests were performed on the test specimen described above on May 21, 1976 and May 26, 1976, at Architectural Testing, Inc. Tests were performed in accordance with ANSI 134.1-1972 for DH-A2-HP (50).

Test	Results	
	Actual	Allowable (inches)
1. Air infiltration	0.229	(1)
2. Water penetration	None	None
3. Uniform load deflection member tested: Meeting rail	.214	0.297
4. Uniform load structural member tested: Meeting rail	.009	.208
5. Horizontal load test member tested:		
Inside sash meeting rail	.058	.250
Inside sash bottom rail	.096	.250
Outside sash meeting rail	.088	.250
Outside sash top rail	.090	.250
6. Vertical load test member tested:		
Inside sash meeting rail	.080	.160
Inside sash bottom rail	.107	.160
Outside sash meeting rail	.108	.160
Outside sash top rail	.101	.160
HIGH PERFORMANCE (H.P. 50)		
7. Water penetration	None	None
8. Uniform load structural member tested: Meeting rail	.009	.208

[1] 0.50 cfm/ft of crack.

This specimen, as tested, meets or exceeds the criteria set forth in ANSI A134.1-1972 for DH-A2-HP (50). The report does not constitute certification of this product which may only be granted by Associated Dallas Laboratories. The necessary information to obtain certification is being forwarded to the program administrator.

DAVID G. MAJOR,
Director of Testing.
DALE E. HEIN,
Vice President.

GRAHAM ENGINEERING, INC., P.O. BOX 1104, YORK, PA., APRIL 5, 1971, REPORT OF PERFORMANCE REQUIREMENTS TESTS ON ALUMINUM DOUBLE HUNG WINDOW (TILT ACTION) FOR AIR MASTER CORP.

GENERAL

One aluminum window of an overall nominal size of 3'8" wide by 5'0" high designated as Double Hung Tilt Window was submitted to Graham Engineering Corporation for performance requirements tests.

The window unit consisted of two operable sash hung on spiral balances and secured in a closed-locked position by means of a cam operated lock at mid-span of the meeting rails. The top sash was 3'6" x 2'5½" in size and the bottom sash was 3'6½" x 2'5½" in size.

The interior leg of the top sash was weatherstripped with Schlegel RB-6327-187 pile weatherstrip. All other weathership except the bottom rail of the bottom sash was Schlegel RB-6320-187 pile weatherstrip. The bottom sash at the sill was weatherstripped with a bulb vinyl.

TEST PROCEDURE

All tests listed in the Test Results were conducted in accordance with the procedures indicated in Section 2, Paragraph 2.1.4. Performance Requirements of the Architectural Aluminum Manufacturers Association AAMA 302.7, DH-B1 Double Hung and "HP" Series Aluminum Windows Specifications dated January 1971 and as specified in ANS1-A134-1-1970, American National Standard, specifications for aluminum windows.

TESTS RESULTS

2.1.4.1 Air infiltration test

Based on an overall weatherstripped sash crack perimeter of 20.33 feet, the air infiltration was determined to be .688 cubic feet per minute per foor of crack at a static air pressure (1.56 PSF) equivalent to the pressure exerted by a wind velocity of 25 miles per hour.

Specification maximum permissible air infiltration is 0.75 cfm per foot.

2.1.4.1. Operating force test

The force required to operate the sash in either direction after the sash was in motion was determined to be as tabulated below:

Operating force—Pounds

Opening direction and closing direction

Bottom Sash 12	11
Top Sash 13	12

Specification maximum permissible operation force is 25 pounds.

2.1.4.2 Water resistance test

The window was subjected to 2.86 and 3.33 PSF static test pressures for 15 minutes at 5 GPH of water per square foot of window.

During the 15 minute test period under prescribed test conditions, no water passed the interior face of the window frame.

Specification requirement is that no water shall pass the interior face of the window frame during a 15 minute test period.

2.1.4.3 Uniform load deflection test

Maximum deflection occurring at mid-span of the indicated window members under an exterior uniform load of 10 pounds per square foot is tabulated as follows:

Window member	Span (inches)	Deflection (inches)	
		Actual	1/175 of span
Meeting rail	49½	0.098	0.242
Side rail top sash	29½	.108	.168
Side rail bottom sash	29½	.105	.168

Specification maximum permissible deflection is 1/175 of the test span.

2.1.4.4 Uniform load structural test

After subjecting the window unit to an exterior uniform load of 20 pounds per square foot and an interior uniform load of 10 pounds per square foot at separate and individual loadings, the amount of permanent deformation at mid-span of the meeting rail and sash stiles was determined to be as tabulated below:

Load PSF	Meeting rail deformation	Top sash-side rail deformation	Bottom sash-side rail deformation
20 Exterior	0.006	0.008	0.007
10 Interior	.014	.006	.006

Specification maximum permissible permanent deformation is .4 percent of the span or .170 for the meeting rail and .118 for the side rails.

2.1.4.5 Horizontal load test

Maximum deflection occurring at mid-span of the indicated sash member under a concentrated load of 20 pounds acting horizontally at mid-span is tabulated below:

Sash member	Horizontal deflection (inches)	
	Actual	Maximum permissible
Bottom meeting rail	0.100	0.219
Bottom lift rail	.084	.219
Top meeting rail	.051	.219
Top pull rail	.067	.219

2.1.4.6 Vertical load test

Maximum deflection occurring at mid-span of the indicated sash member under a concentrated load of 20 pounds acting vertically at mid-span is tabulated below:

Sash member	Vertical deflection (inches)	
	Actual	Maximum permissible
Bottom meeting rail	0.051	0.094
Bottom lift rail	.051	.094
Top meeting rail	.052	.094
Top pull rail	.048	.094

3.1.2.2 Uniform load structural test (HP)

After subjecting the window unit to an exterior uniform load of 40 pounds per square foot and an interior uniform load of 20 pounds per square foot at separate and individual loadings, there was no glass breakage, permanent damage of fasteners, hardware parts, or any other damage causing the window to be inoperable and the amount of permanent deformation at mid-span of the meeting rail and the side rails was determined to be as tabulated below:

Load PSF	Meeting rail deformation	Top sash-side rail deformation	Bottom sash-side rail deformation
40 exterior	0.045	0.015	0.010
20 exterior	.018	.012	.016

Specification requirement is that there shall be no glass breakage, permanent damage of fasteners, hardware parts, or any other damage causing the window to be inoperable or no permanent deformation of any frame or sash member in excess of 0.4 per cent of its span or, in this case, 0.170 inches for the meeting rail and .118 for the side rails.

Comments: The 3'8" wide by 5'0" high aluminum double hung window tested will meet the Performance Requirements, Paragraph 2.1.4, Section 2 and Paragraph 3.1.1, section 3 of the Architectural Aluminum Manufacturers Association AAMA 302.77, DH-B1 Double Hung and "HP" Series Aluminum Windows Specification dated January, 1971 and as specified in ANS1-A134-1-1970, American National Standard, specifications for aluminum windows.

Conducted by

J. SUSKY.

[From the Avenue, April 14, 1977]

PRESERVE A GREAT AMERICAN HOMESTEAD—YOURS!

The first door was probably a rock pushed in front of ancient man's cave, crude but effective. That rock served as protection against the elements, animals and no doubt other men. Doors have evolved and refined since that point long buried in man's past, but the fundamental purpose of any door is essentially the same—protection.

However, a door has become more than just a physical barrier between a house and the outdoors. It is the focal point of the house. The front door is generally centered with respect to the first floor or accented by overhangs or porches. The first thing one encounters entering a house is a door, thus it makes the first impression.

WOOD DOORS

Entrance doors are one of two general types, wood and metal. Wood is by far the most popular door material and is even used in the fabrication of metal doors.

Wood doors are divided into two basic styles, flush and stile and rail. Flush doors consist of a core material, a wood frame surrounding the core, and two skins, one on each face. The core material is either particleboard, in a solid core door or honey-combed corrugated board in a hollow core door. Door skins or facings are made of thin layers of wood laminated together or hardboard (masonite) stile and rail doors have solid wood sides (stiles) top and bottom (rails) and panels. Stile and rails door designs can range from a traditional 6 panel Colonial to a custom hand-carved mahogany creation.

METAL DOORS

In this day of fuel conservation metal doors offer a new concept for an energy conscious world. Featuring insulating cores, metal door systems average more insulating value than wood doors.

The two core materials used in fabrication of metal systems are styrafoam and polyurethane foam. The polyurethane foam is twice as good an insulator as styrafoam which itself has twice the insulation value of wood.

In addition to the special core material, the metal door system utilizes a magnetic weatherstripping which provides a virtually airtight seal. The seal is of the same type used on freezer doors.

The combination of insulating core and "airresistant" weatherstrip provide the best answer to outside air infiltration currently available. Being metal, the door can not warp, shrink, split or crack as wood products are apt to do.

The metal system, while more costly initially can turn into a savings in the long run; reducing fuel costs and increasing intervals between replacements.

Metal doors are available in most wood doors styles and some that are unique to only metal systems. Metal provides more security value than wood. Metal means strength durability economy for today's homeowner.

In order to maintain that good first impression look on your door, whether wood or metal, it should be kept clean and dry. The door should have a sealer coat top, bottom, edges and faces and at least one finish on all sides.

If your door is cracked or split at the panels, you could lose precious fuel dollars through them, even with a storm door. Check your weather stripping visually and with your hand or ear on a cold windy day. Have it replaced or refitted as necessary. The door itself should be replaced or repaired as time and use take their toll.

Remember the door is the focal point of your home let it reflect your pride in the community.

STATEMENT OF LOUIS S. CLAPPER, DIRECTOR, CONSERVATION DIVISION NATIONAL WILDLIFE FEDERATION

The National Wildlife Federation, with national headquarters at 1412 16th Street here in Washington, D.C. is an organization which seeks to attain conservation goals through educational means. NWF affiliates are located in all 50 states, Puerto Rico, Guam, and the Virgin Islands. These affiliates, in turn, are made up of local groups and individuals who, when combined with associate members and other supporters of the National Wildlife Federation number an estimated 3.5 million persons.

I appreciate this opportunity to comment on several of the tax provisions in the National Energy Act. The wide ranging environmental effects of energy ex-

ploration, production, and use (e.g., mining, power plant construction, air and water quality, and solid waste, to name just a few) will be shaped by this plan for years to come. The environmental consequences of such exploration and production are massive, and consequently the National Wildlife Federation believes that energy conservation must be given the highest priority in the National Energy Act. By reducing the need for both additional oil imports and additional domestic energy production, conservation and improved efficiency in the use of energy can contribute to national security as well as to environmental protection. We strongly support provisions of this legislation which strengthen the conservation aspects of the National Energy Plan. A copy of the Resolution concerning energy conservation adopted by our annual convention in 1974 is attached at the end of this statement.

The National Wildlife Federation generally favors the thrust toward conservation reflected in the tax measures enacted by the House in H.R. 8444. The following points are of specific interest to the Federation:

1. *Residential Insulation Tax Credit.* The House enacted a 20% tax credit on the first $2,000 spent on home insulation, available through December 31, 1984. We strongly support this tax credit as an incentive to improve the energy efficiency of the nation's residential units. Almost 20% of U.S. energy is used to heat and cool buildings. The potential savings from improving the energy efficiency of these buildings are enormous. Installation of ceiling and roof insulation, weatherstripping of doors and windows, caulking of cracks and installation of clock thermostats could result in significant energy savings. Although home heating and cooling bills provide homeowners with a powerful incentive to improve the energy efficiency of their homes, we believe that the tax credit is an important and necessary additional inducement.

2. *Solar Tax Credit.* The National Wildlife Federation was very pleased with the House passed tax credit of 30% of the first $1,500 and 20% of the next $8,500 of expenditures for solar and wind energy equipment. This tax credit is also available through December 31, 1984. We urge this Committee to increase the first part of this credit to 40% of the first $1,500 spent. Such a tax credit for solar energy devices would be an effective tool for accelerating the installation of solar heating and the development and installation of solar cooling systems. Solar energy systems are one alternative that will reduce our ever-increasing dependence on imported fuel. Every energy source in the past has been subsidized by the Federal government in one way or another and now solar energy should be encouraged in this manner.

The two part tax credit enacted by the House is essential to provide added incentives for hot water heaters. Most authorities agree that an emphasis on the basic hot water system would significantly encourage and expand solar system application and production. The solar tax credits significance lies in its effect on the public confidence. The tax credit would signal to the American people that solar energy is a viable, clean, efficient form of energy that should be utilized whenever possible.

3. *Gas Guzzler Tax.* It is estimated that transportation consumes 26% of U.S. energy and that automobiles use half of that amount. Legislation passed by the House established a tax on new cars that are fuel inefficient, beginning with 1979 models that get less than 15 miles per gallon. Under previously enacted law, the Secretary of Transportation already has established mandatory fleet mileage standards for new cars between now and 1985. However, experience with the weakening of automotive air pollution standards has convinced us of the value of backing up federal regulations with strong incentives in the marketplace, such as the gas guzzler tax. We hope this Committee will strengthen the gas guzzler tax to encourage more miles per gallon. This could be accomplished by either narrowing the "window" between the current DOT fleet mileage standards and the imposition of this tax, or by extending the first increment, low-level tax across the "window". We also urge the Committee to extend application of this tax to recreational vehicles, light trucks, and vans. We believe this will significantly increase the energy savings potential of this legislation.

We appreciate having the opportunity to comment on these important issues.

Attachment.

CONSERVATION OF NATURAL RESOURCES AND ENERGY

WHEREAS, shortages of energy exist for such beneficial purposes as transportation, industrial uses, agriculture, home heating and recreation; and

WHEREAS, from its inception the National Wildlife Federation has stood for conservation or wise use of all natural resources, including those which relate to energy; and

WHEREAS, this organization continues to be of the firm conviction that energy can be produced and utilized without degradation of the environment;

NOW, THEREFORE, BE IT RESOLVED that the National Wildlife Federation, in annual convention assembled March 28–31, 1974, in Denver, Colorado, hereby supports the following principles:

That protection be accorded the environment even if such provisions increase the cost of energy production and utilization;

That energy conservation be given the highest priority through national, state, and local policies such as encouraging use of the most efficient modes of transportation, increased efficiency of energy utilization through strict building codes, changes in rate structures, increased reliance on recycling, and better industrial processes which demand less energy and cause less pollution than uses of virgin materials;

That major emphasis be given to funding for a massive Federal research and development program stressing those sources of energy which have the least adverse impacts upon the environment—solar, geothermal, and fusion—as well as to the methods of utilization of fossil fuels which are least harmful, such as coal gasification and liquefaction;

That Federal and private nuclear programs be directed at the problems of safety of fission plants and to the safe management of radioactive wastes they generate as well as to solving the environmental problems of effects of thermal pollution and hazards posed to aquatic life from massive water intake and outflow operations.

That exploitation of oil shale deposits under public lands be accomplished only after suitable research has determined: 1. identification of the least harmful practical method of extraction, including "in situ" retorting; 2. that existing water rights are fully protected; 3. that surface underground waters be protected from pollution and reduction of flow; and 4. that spoil be disposed of by methods which permit reclamation of disrupted surface areas;

That offshore oil exploration and production be undertaken only after; 1. their locations are cordinated with over-all onshore land use or coastal zone management plans by units of Government at all levels which fully protect public recreational and wildlife values; 2. wells are fully equipped with fail-safe spill preventive devices; 3. assurances are provided for inspection and monitoring of safety precautions by responsible governmental officials; and 4. bonds to ensure containment and cleanup of spills are required;

That deepwater ports be authorized only after their locations have been coordinated with over-all onshore land use or coastal zone planning by units of government at all levels;

That coal mining be strictly regulated to protect the environment, even if this process requires an orderly phase-out of stripping; further, the Government should take steps to revitalize the underground coal mining industrial methods whereby the vast majority of our coal resources must be recovered; and, that strip mining for coal should be permitted only after significant social, environmental, and economic questions are satisfactorily answered;

That units of government at all levels nad private industry be encouraged to recover organic portions of solid wastes as sources of energy;

That planning and development of Federally-sponsored and/or financed hydroelectric power facilities be made to conform with the discount rate formula and other guidelines contained in the recently-promulgated "Principles and Standards for Planning Water and Related Land Resources".

Statement of the American Public Power Association

The American Public Power Association is a national service organization representing approximately 1,400 local, publicly-owned electric utility systems in forty-eight States, Puerto Rico, the Virgin Islands, Guam and American Samoa.

APPA opposes the crude oil equalization taxes contained in Section 2031 of H.R. 8444. Under the provisions of Section 2031 an excise tax would be imposed on the first purchase of domestically produced crude oil. The tax would be phased in beginning in 1978 and would be fully in place by 1980. Beginning in 1980, the excise tax would apply to all price controlled oil and would be equal to the differ-

ence between the controlled price of each classification of crude oil to what its uncontrolled price would be absent price controls.

APPA believes that imposition of the crude oil equalization taxes as proposed in Section 2031 of H.R. 8444 would tend to increase not only the price of oil, but the prices of other substitute fuels as well. The impact on the many small, publicly-owned electric utilities which use oil products as fuel for their electric generators would be to render the continued operation of some eletcric generating equipment uneconomic. This would, in turn, impose higher costs on the ultimate consumers as the utilities thus affected would be required to seek alternative sources of power supply while continuing to be burdened with capital charges for their oil-burning equipment.

Of the 672 local, publicly-owned electric utilities in the U.S. that have electric generating capacity, 72 have combustion turbines and over 500 have diesel engines which typically burn either natural gas or fuel oil. With the availability of natural gas for electric generation approaching the vanishing point, these machines have no available fuel choice—they must burn oil. Typically, these oil-dependent electric generators are small—total diesel engine installed capacity of public systems averages only 6.3 megawatts—and serve small, relatively isolated, communities in the central U.S. For example, of the just over 500 publicly-owned systems with diesel engine generating capacity, 75 are in Iowa, 18 in Illinois, 63 in Kansas, 15 in Louisiana, 54 in Minnesota, 31 in Missouri, 17 in Oklahoma, 20 in South Dakota, 28 in Texas, and 16 in Wisconsin. The impact of the proposed crude oil equalization tax on the electric utility systems of these small communities and, hence, on their citizens, would be severe.

Section 2041 of the House bill would impose an excise tax on taxable uses of oil and natural gas beginning in calendar year 1979 for some uses. For electric utilities the tax would not be imposed until 1983, and certain facilities that were in existence or under construction on April 20, 1977, and which are precluded from using coal by Federal or State air pollution regulations, would be permitted the use of oil or natural gas exempt from taxation. Non-utility electric generating units of 100 megawatts or less capacity are also exempted from the tax. This tax is designed to limit the use of oil and natural gas and to induce the substitution of alternative fuels where possible.

APPA supports the objectives of increased coal use and of prudent use of our limited oil and gas resources. APPA would urge that there be clearly defined exemptions to the proposed use tax for small steam electric and diesel electric generators, and for combustion turbines and combined cycle units used for peaking and intermediate electric power generation, to the extent that such generating units are unable to burn alternative fuels and are used for peaking and intermediate electric power generation (up to a maximum of 4600 hours per year). The proposed exemption of generating facilities with a rated capacity of less than 100 megawatts that is suggested for non-utility generating facilities might be extended to similar, small size utility facilities. The tax should not be imposed on uses that cannot be replaced by coal or other fuels, nor should it operate to penalize the use of equipment designed to make maximum efficient use of oil and gas as fuel. APPA also supports the House bill exemption for existing or contractually committed facilities that are precluded from using coal by Federal or State air pollution regulations.

Special attention should be given to Section 2051 of H.R. 8444 which provides for offsetting credits against the tax on business use of oil and gas, and the Section 2061 which provides for a business energy investment credit. Under Section 2051 a credit is allowed for 100 percent of investments in qualified alternative energy property up to a maximum of the amount of users tax liability for the calendar year. Excess investment, however, may be carried forward and treated as qualified energy investment for the following year. The business energy investment credit provided for under Section 2061 is a special 10 percent investment credit against income tax liability, and is in addition to the regular 10 percent investment tax credit. It is to be available for investments in certain types of energy-related property made after April 19, 1977 and before January 1, 1983. Qualifying energy property is defined to include the same group of equipment which is eligible for the business oil and gas use tax credit. A taxpayer may use either the use tax credit or the business energy credit for alternative energy property. With the use tax credit, all qualified investment not offset by the use tax credit is eligible for the regular investment tax credit. With election of the energy investment credit for alternative energy property, that credit and the regular investment tax credit may be used against all of the taxpayer's income tax liability.

APPA opposes the extension of new tax credits to investor-owned electric utilities. A review of the financial status of investor owned electric utility systems reveals that, in aggregate, they would have considerable difficulty utilizing additional tax benefits, even with current liberal carry-forward and carry-back provision. Federal Power Commission data reveals that for the 12-month period ended March 31, 1977, the nation's investor owned electric utilities increased their net income by 16.5 percent—from $6.48 billion to $7.55 billion. While net income increased, however, actual Federal income taxes decreased by 16.5 percent, from $797 million in 1976 to $666 million in 1977. Federal income taxes charged represented 1.3 percent of total electric operating revenues for the 12 months ended March 31, 1977, compared to 1.7 percent for the same period in 1976.

At the beginning of 1976 private power companies had available more than $500 million in unused tax credits, and accumulated deferred credits in excess of $1,600 million. There is no logic in extending still more tax relief to these companies at a time when they are collectively unable to utilize that which they already have. The purposes of the National Energy Act would not be advanced by such action.

Financial benefits of tax credits against normal income tax liability are not available to the non-profit, publicly-owned electric utility systems. If there is a genuine need to encourage conservation and promote the rapid conversion to coal through financial incentives, then a nondiscriminatory means to this end should be devised. Financial incentives should perhaps be limited to cash rebates of user taxes on oil and gas, and be equally available to all utilities public and private alike.

Under H.R. 8411 privately-owned electric utilities making investments in qualified alternative energy property would be permitted both the use tax credit up to the limit of their actual users tax liability, plus a regular investment tax credit for that part of the investment not already offset by the use tax credit. Should the investor-owned electric utility elect to use the ten percent energy investment credit, he still also gets to take advantage of the regular investment tax credit. In addition, investor-owned utilities would be granted still another tax benefit in the form of accelerated depreciation for prematurely retired oil or gas burning equipment. Again, this tax benefit is not available to non-profit, publicly-owned electric utility systems.

This constitutes a clearly discriminatory preference being granted to investor-owned utilities. There is no conceivable justification for this double benefit.

APPA believes that if tax incentives are to be used to encourage the conversion of energy generating equipment to coal-firing, then a conservation use tax rebate available to all electric utilities, both public and private, represents a fair and reasonable approach.

STATEMENT OF ROBERT H. STEEL, CAE EXECUTIVE VICE PRESIDENT, NATIONAL SWIMMING POOL INSTITUTE, WASHINGTON, D.C.

My name is Robert H. Steel. I am Executive Vice President of the National Swimming Pool Institute, the national association which serves 2,000 swimming pool industry manufacturers, distributors, builders, retailers, and service companies located in all 50 states. Our headquarters is at 2000 K Street Northwest, Washington, D.C.

I wish to testify concerning certain provisions of The Energy Tax Act of 1977, specifically of Title II of H.R. 8444. Section 2011 of the House bill on residential energy credit for solar and wind energy equipment now includes language which discriminates against swimming pools. In the Summary section of the bill, for example, is the following: ". . . expenditures properly allocable to swimming pools are not included in this credit." Further amplification and clarification of this is contained in the Residential energy credit Section 44C of the Code which states, in part: "Qualifying property does not include any swimming pool used as an energy storage medium . . ." and "Use for a swimming pool is not treated as a personal residential purpose."

While we understand that such language discriminates against a residential pool more or less on the same basis that second homes are eliminated from consideration for special tax credits, we believe that such restrictions, if ultimately adopted and passed into law, may in fact set back the development and implementation of advanced solar systems and techniques for all residential and commercial uses.

This is surely not the intent of the Congress or of the Administration.

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Let me explain further. New information has just come to our attention last week at a Solar Symposium attended by various representatives of the solar energy and pool industries to confirm what many of us in the pool industry have long maintained: A residential swimming pool serving as the energy storage facility in solar energy systems for heating and cooling the residential environment may be the technical and economic key for making such systems viable and attractive to a large number of Americans.

Such use, this new, albeit preliminary data indicates, can make hundreds of thousands of home solar systems not just technically feasible, but economically attractive today. Since there are now approximately 1.3 million permanent, in-ground residential swimming pools and perhaps as many as three or four million sizable above-ground pools spotted all across the country, the impact of implementing solar systems on just a small percentage of these existing pools could have a major impact on the acceptability of solar systems, on the development of the fledging solar energy industry, and on the consumption of fossil-fuel provided or generated fuels in the residential sector.

Before providing more information on these developments, let me first give you a short background briefing about the nation's $2.5 billion industry which provides the residential, semi-public and public facilities for the nation's most popular outdoor recreation, swimming.

According to a Bureau of Outdoor Recreation report issued in 1974, swimming ranked second only to picnicking as the nation's most popular outdoor activity. 82 million to 77 million participants. Playing outdoor games or sports ranked a far-distant third with 60 million participants.

Americans spent more time in pools—an estimated 719.6 million hours, than they did playing tennis (only 170.5 million hours), golfing (310.7 million hours), bicycling (428.4 million hours), or boating (536.3 million hours).

The popularity of swimming helped spawn a sizable industry in America. Of the estimated $2.5 billion total, approximately half is spent in the residential sector. Today Americans are buying permanent, in-ground residential swimming pools at a rate of about 80,000 per year. Additionally, an estimated 200,000 portable, above-ground pools are sold each year.

Viewing sales figures of these proportions, it becomes clear that the residential pool has long ago outlived its reputation as "California-only" and its stigma as being "for the rich only." In fact, the Northeast was the nation's largest pool market during the years 1967 through 1974. And for four of those same years even the Midwest outranked the California-reporting district.

Moreover, various industry studies in the last few years have revealed the typical home pool buyer to be a family-oriented, middle-income person who likes to swim. In 1976, the last year for which figures are currently available, the "average" pool in the United States measured about 17 x 32 feet, cost about $7,000, and was financed over a 5 to 7 year period. Twenty percent of all pools were smaller than 15 x 30 feet and cost an average of just over $6,000. In the Northeast, however, where 14,000 in-ground pools were sold, the average price was just over $3,000 for this small pool and was just over $6,000 for the middle or average size pool.

We in the pool industry have long exhibited a conscious concern for the nation's energy dilemma and have been an active supporter of national energy conservation goals. In 1974 we developed and promulgated energy conservation information both for the businesses in our own industry as well as for owners of the product which our industry provides. Our industry has been active in developing new products and new methods of operation to further enhance energy conservation.

Moreover, our industry has been in the forefront of solar energy development. A government report of 1974 estimated that two-thirds of all solar panels produced that year were shipped for swimming pool applications. Yet we estimate that still today less than one percent of all pools employ solar systems. Even from these rough estimates the potential for additional penetration using readily available hardware is enormous.

But let us now consider new developments.

Last week at our Solar Symposium, preliminary information was offered from actual experimental installations as well as from a computer anaysis of hypo-

thetical installations in a sampling of cities with different climates. This information illustrated that a swimming pool serves as an excellent storage facility for solar-collected energy.

In the experimental model, Robert Sheppard, president of Master Pools by Asheville (N.C.) Pool and Gunite Co., Inc. installed a new home solar heating system using solar collectors, standard "off-the-shelf" heat pumps and an 18 x 40 foot, 30,000 gallon pool to serve as an energy storage tank.

This system is reported substantially less expensive than other solar heating systems and during recent weather in North Carolina saved Sheppard an average of $150 per month in heating bills.

"During warm summer months, the system works in reverse and, in effect, the house is actually used to heat the pool while the pool cools the house," says Sheppard. "If the pool becomes too warm, water is channeled back to the collectors during the night and the pool is cooled."

Additional theoretical evidence presented at the Symposium by an engineer in Menlo Park, California, was based on a computer model study using a series of acceptable assumptions concerning first costs and on-going operational costs of various systems in five climatic areas of the United States.

It is one understanding that this preliminary data illustrated very positively that a swimming pool would serve as an excellent energy storage facility for solar-collected energy.

When a total system employing the properly engineered combination of solar collector panels, standard water-to-air heat pumps, and an average size backyard pool is installed, the model reveals that the heating and cooling of the home and of the domestic hot water is energy efficient and very economical. Not only does this system provide a viable alternative to the use of fossil fuels, but it can cost less than conventional fuel systems over a reasonable pay-back period and literally thousands of dollars less in life cycle costs.

This information was received with a great deal of enthusiasm by Symposium participants including those from ERDA, the FEA, and NBS.

As additional information becomes available to us, especially from this computer model study, I would be most pleased to make it available to this Committee and to other interested parties as well.

In the meantime, I urge this committee to consider closely the record of achievement compiled by the industry, the potential contribution such an industry can make in the future to the national energy goals, and the basic discriminatory nature of present wording in the aforementioned sections of H.R. 8444.

I hope this Committee will agree with us and eliminate such wording from its version of this important bill. We request that this discrimination against the pool as an energy storage medium be corrected to clear the way for much needed technological and market development of energy systems that will help resolve America's energy needs as quickly and as economically as possible.

Thank you for your full consideration.

STATEMENT OF THE CANVAS PRODUCTS ASSOCIATION INTERNATIONAL

Tax credits for energy saving home improvements are considered in Bill H.R. 8444, currently before the Senate Finance Committee.

On behalf of the 1500 awning manufacturers across this country, the Canvas Products Association International urges awnings be defined as energy saving devices under this bill.

Studies conducted by the American Society of Heating and Air Conditioning Engineers show awnings keep homes 8 to 15° cooler. They reduce interior heat gain 72 to 77 percent, if properly installed. Enclosed is a copy of the ASHRAE study. This heat gain is reduced in three ways: Awnings reflect the direct sunlight coming into the home, they reflect most of the indirect sunlight, and also reduce the heat gained through transference by the window glass.

This means substantial reduction in the energy consumption of air conditioners. The savings result from reduced operating time for existing units, and smaller units are adequate, when a new or replacement units is purchased. In fact, tests by the Small Homes Council report awnings reduce air conditioning bills 25 percent.

Awnings are the most effective window treatment for energy saving, according to the National Bureau of Standards, the testing body for the U.S. Department of Commerce.

In conclusion, we urge awnings be included by the Finance Committee as an energy saving device in this bill at this time.

[No. 1645]

Heat Gain Through Windows Shaded by Canvas Awnings

(By Necati Ozisik* and L. F. Schutrum**, Cleveland, Ohio)

This paper is the result of research carried out by the American Society of Heating and Air-Conditioning Engineers at its Research Laboratory located at 7218 Euclid Avenue, Cleveland 3, Ohio.

Research on the performance of various kinds of awnings in reducing heat gain through windows has been carried out at the ASHAE Research Laboratory under the guidance of the TAC on Heat Transfer through Fenestration † as a part of a continuing program of research to develop design data for heat gain through windows. The awnings to be tested were selected at a meeting attended by representatives of the awning industry, members of the TAC, and members of the ASHAE Research Laboratory staff, and were judged to be typical for the majority of applications. The shape, color, venting characteristics, and specific material of the awning were recognized as the most important factors, and the investigation was directed to determine the relative importance of each of these variables. The percent of window coverage was kept constant in all tests.

Test Apparatus

The Calorimeter.—Heat gain measurements were made by means of the solar calorimeter essentially as described in an earlier published paper.[1] 1. The apparatus could be rotated to any desired orientation and could be tilted through 90 deg about a horizontal axis. The test window had no setback, and the surface area was 44¼ x 44¼ in. in size. A water and ethylene glycol mixture, the inlet temperature of which could be controlled as desired, was circulated through the tubes inside the calorimeter to absorb the heat gain.

Instrumentation.—All temperature measurements were made by means of copper-constantan thermocouples, which permitted taking individual as well as parallel readings to obtain average temperatures.

Measurement of solar radiation was made with 2 Eppley thermo-electric type pyrheliometers, one of which was mounted on the upper face of the panel just above the awning, and the other on the lower face at about 1 ft below the lower edge of the test window. A third pyrheliometer was mounted on the same surface of the panel at the same level as the lower edge of the awning, in order to take measurements of the ground reflected component of solar radiation.

Low temperature radiation received from the sky and the surroundings was measured by a radiometer described in Reference 2.

Wind velocity was measured by a calibrated cup-type anemometer. Two 16-point electronic recorders provided continuous readings throughout the tests.

Awnings and Glasses.—The four different awnings selected for testing included:

1. Conventional type, canvas, outside dark green, underside grey-green.
2. Conventional type, canvas, outside white, underside grey.
3. Venetian type, canvas, outside dark green, underside grey-green.
4. Conventional type plastic fabric (woven from polyvinylidene chloride monofiliments) outside and inside dark green.

The shape and size of these awnings are given in Fig. 1. The effect of venting the conventional type of canvas awnings was investigated by using standard head-rod clamps and extended head-rod clamps as the positioning devices. The former clamp permitted almost no venting at the top, whereas the latter allowed a ¾-inch opening at the top to vent the hot air trapped under the awning.

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†Personnel: R. W. McKinley, Chairman; R. C. Jordan, Vice Chairman; W. J. Arner, T. C. Carson, E. W. Conover, R. B. Crepps, W. B. Ewing, J. E. Frazier, H. F. Kingsbury, J. B. Leavy, Manny Levine E. C. Miles Bruno Morabito, F. W. Mowrey, D. J. Vild, H. B. Vincent, O. F. Wenzler, C. J. Youngblood, Jr.

[1] Exponent numerals refer to References.

Presented at the Semi-Annual Meeting of the American Society of Heating and Air-Conditioning Engineers, Minneapolis, June 1958.

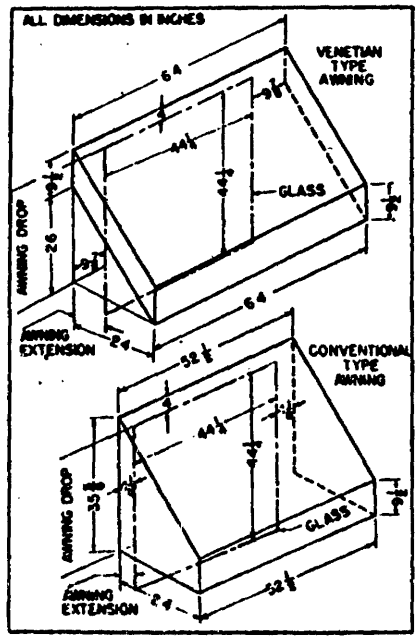

FIGURE 1.—Shape and size of awning tested

The canvas material was opaque to solar radiation, whereas the loosely woven plastic material permitted a fraction of the solar radiation to pass through it. The quantity of solar radiation passing through the plastic material and falling upon the glass surface was largely a function of the angle of the solar beam with the awning surface. Variation in the transmittance of the plastic material with the incidence angle of an incandescent light beam was determined by pyrheliometer measurements. The transmittance, reflectance, and absorptance of the awning materials obtained from spectral tests and from experiments made at the Laboratory using a pyrheliometer, are shown in Table 1.

The glasses used in combination with the awnings were ¼-in. thick regular plate glass and ¼-in. thick heat absorbing glass.

Test Procedures.—Tests were made with the calorimeter in a vertical position for fixed orientation or following the sun. During each of the tests of 20 min duration, data recorded included the altitude of the sun, wall solar azimuth, wind velocity and direction, and condition of the sky in addition to the measurements of temperature and solar intensity. The ground-reflected component of the solar radiation was recorded by the third pyrheliometer which was covered on top in order to shade the pyrheliometer from the solar radiation coming from the sky. The total heat gain of the calorimeter was obtained by computation from the quantity of circulating liquid and its temperature rise, and was corrected for the heat exchanges at the back and side surfaces of the apparatus. The total heat gain thus obtained was the sum of the solar energy transmitted through the glass and the convection-radiation gain from the glass. The transmitted solar energy was computed by subtracting from the total heat gain, the convection-radiation gain, which was obtained from calibration curves based on the temperature of the glass and the temperature of the heat absorbing surfaces of the calorimeter.

TABLE 1.—SOLAR REFLECTANCE AND TRANSMITTANCE OF AWNING MATERIALS

Awning material	Normal reflectance: Pyrheliometer measurements [1]	Normal reflectance: Spectral measurements [2] (0.3 to 2.1 micron)
Canvas:		
Dark green:		
Outer surface (dark green)	0.21	0.22
Inner surface (grey green)	.32	----------
Silver blue (outer surface)	.27	.25
Green (outer surface)	----------	.36
Dusty rose (outer surface)	----------	.37
Silver rose (outer surface)	.41	.40
White:		
Outer surface (white)	----------	[3] .91
Inner surface (grey)	.53	----------
Plastic:		
Dark green (both sides)	.27	----------
Blue (both sides)	.32	----------
Red (both sides)	.34	----------
		Transmittance
Canvas/plastic		0
Direct solar radiation		[4] .25
Diffuse solar radiation		.15

[1] Reflectances compared with white sample in sunlight.
[2] Spectral values from Electrical Testing Laboratories, Inc. (0.45 to 1.25 micron) extended to (0.3 to 2.1 micron).
[3] For design data 0.70 was used to allow for weathering.
[4] Normal.

Analysis of Problem

Heat Transfer through Windows.—A window receives direct solar radiation from the sun, diffuse solar radiation from the sky, reflected solar radiation from the surroundings, and low-temperature radiation both from the sky and the surroundings. If there is no shade of any kind on the window to prevent the sun's direct beam falling upon the glass, a large fraction of direct, diffuse, and reflected solar radiation passes directly through the glass into the room, a smaller fraction is reflected back into the atmosphere, and the remainder is absorbed by the glass. The fraction of solar radiation which passes directly through the glass is hereinafter referred to as the transmitted heat gain. The solar energy absorbed by the glass causes an increase in glass temperature until an equilibrium is reached

between the rate of heat absorption by the glass and the rate of heat dissipation from the glass by convection and radiation, both into the room and to the outdoors, with the heat storage in the glass remaining constant at equilibrium. The heat dissipation from the warm glass into the room is hereinafter referred to as the convection-radiation heat gain.

In the presence of an awning which is opaque to solar radiation, if no direct beam falls upon the glass surface, the ground reflected solar radiation entering through the openings of the awning and the diffuse sky radiation from that portion of the sky visible by the glass under the awning form the major portion of the transmitted heat gain.

If the awning has a high surface temperature, it tends to increase the glass temperature both by radiation and by warming the air under the awning. Therefore, in the presence of the awning, the glass temperature, which controls the convection-radiation gain into the room, is a function both of the awning temperature and the temperature of air under the awning.

The total heat gain into the room through a window is the sum of the transmitted and convected-radiated heat gains. In the following sections, these two components are treated separately.

Transmitted Solar Energy.—Consider an awning assembly, in which the awning shades all the glass surface so that no direct beam strikes the glass. Assuming the awning material is opaque, the solar radiation received by the glass is due to the ground-reflected and sky-diffuse solar radiation entering through the openings of the awning and falling upon the glass surface, both directly and after being reflected from the underside of the anwing onto the glass. Therefore, for a given awning, the transmitted heat gain is largely a function of the ground reflected component of solar radiation.

A relation between the transmitted heat gain and the ground reflected component of solar radiation was obtained by plotting the transmittance [2] for awning-glass combinations against (I_{GV}/I_{dV}), where I_{GV} and I_{dV} are the intensity of the ground reflected and the total diffuse solar radiation falling upon a vertical wall having the same orientation as the window. Figs. 3 and 4 show this relation for the conventional and venetian type of canvas awnings respectively in combination with regular plate glass. The solid lines in the figure represent the calculated values, the treatment of which is given in Appendix A. The experimental values fall a little above the calculated line. This is attributed to the fluttering of the side and front flaps of the awning, which exposed a larger opening for the solar radiation falling upon the glass surface.

The canvas material was opaque to solar radiation, whereas, loosely woven plastic material permitted some solar radiation to pass through it. In this case, since the transmittance for awning and glass combinations are dependent upon both (I_{GV}/I_{dV}) and the amount of solar radiation passing through the plastic material, the experimental results could not be expressed in a plot similar to those given in Figs. 3 and 4. However, the additional amount of solar radiation passing through the plastic material and falling upon the glass surface could be computed from the test data.

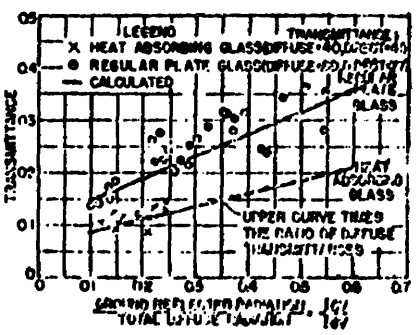

FIGURE 3.—Transmittance of conventional type awning in combination with regular plate and heat absorbing glass

[2] Solar energy transmitted per unit area of the glass surface expressed as fraction of the intensity of total diffuse solar radiation falling on a vertical wall having the same orientation as the window.

The foreground immediately in front of the calorimeter was a dark colored platform surrounded by a grass lawn. The effect of variation in foreground on the heat transmitted through the window was investigated by placing a 4 x 8 ft diffusely reflecting white surface in front of the calorimeter. When the sun was not shining on the white surface, its presence made little difference. However, when the direct rays of the sun fell on the area, the transmitted energy was 2 or 3 times as great with the white surface as with the normal foreground.

In order to present design data on the transmitted component of the total heat gain, the Heating Ventilating Air Conditioning Guide values for the solar radiation intensities for a clear atmosphere at 40 deg North Latitude on August 1 were taken as the basis of design-date calculations. Utilizing the relation given in Figs. 3 and 4 (See Appendix B), transmitted heat gains were calculated for conventional and venetian type canvas awnings and conventional type plastic awnings in combination with regular plate glass. These data are tabulated in Table 2A for East, South, and West orientations and for various hours of the day during which the awning prevents the direct sun from falling upon the glass. It is, however, to be noted, that transmitted heat gains given in this table are for a rather dark foreground. For a light foreground, the transmitted heat gains for canvas awnings will be about twice those given in Table 2A. For the conventional type plastic awning, an amount equal to the transmitted heat gain for the conventional type canvas awning with a dark foreground should be added.

Convection and Radiation Heat Gain.—By writing the basic heat balance equations for the glass and awning, as shown in Appendix C, the convection-radiation heat gain from the glass into the room was related to the outside air temperature and the amount of heat absorbed by the awning and glass. The convection-radiation heat gain obtained from this relation for a 75 F indoor temperature was plotted in Fig. 5 against a term which is the sum of the outdoor air temperature, one third of the solar heat absorbed per unit area of the glass, and a fraction (determined experimentally) of the solar heat absorbed per unit area of the awning. For wind velocities of 2½ to 5 mph, this fraction was approximately 0.10 for conventional type canvas awning with standard-head-rod clamp, 0.07 for the conventional type canvas awning with extended-head-rod clamp, and 0.05 for the venetian type of awning. For wind velocities above 5 mph, the value was 0.05 for all awnings.

The experimental data for the convection-radiation heat gains, after being adjusted to a 75 F indoor temperature, are in satisfactory agreement with the calculated curve as shown in Fig. 5. Values from this curve were used for calculating the design data for convection-radiation heat gains. For these design-data calculations, the outdoor air temperatures and the solar radiation intensities were taken the same as those given in The Guide for a clear atmosphere at 40 deg north latitude on August 1. The convection-radiation design data thus calculated for the awnings in combination with regular plate glass are given in Table 2B, for East, South, and West orientations and for various hours of the day.

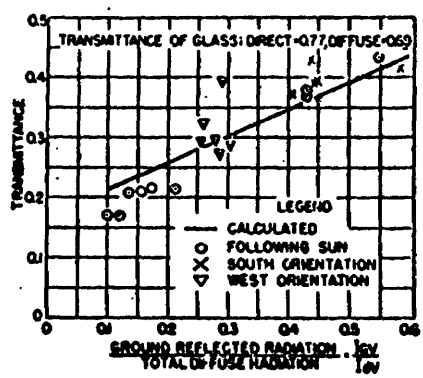

FIGURE 4.—Transmittance of venetian type awning with regular plate glass

Application of Data.—The total heat gain through a window shaded by an awning is the sum of the transmitted and the convected-radiated heat gains. The total heat gains thus obtained, for the window and awning combinations tested, are given in Table 2C. These values are considered to be correct to within ±2 Btu per (hr) (sq ft).

It should be noted that the heat gain values in Table 2C are strictly applicable only to the glass-awning combinations tested. The test window was 44¼ in. square, and all of the test awnings had drops [3] of approximately 70 percent. However, by making the corrections described later, the values in Table 2 may be applied with reasonable accuracy to other awning-shaded windows.

Within reasonable limits, the width of a window does not appreciable alter the total heat gain values given in Table 2C.

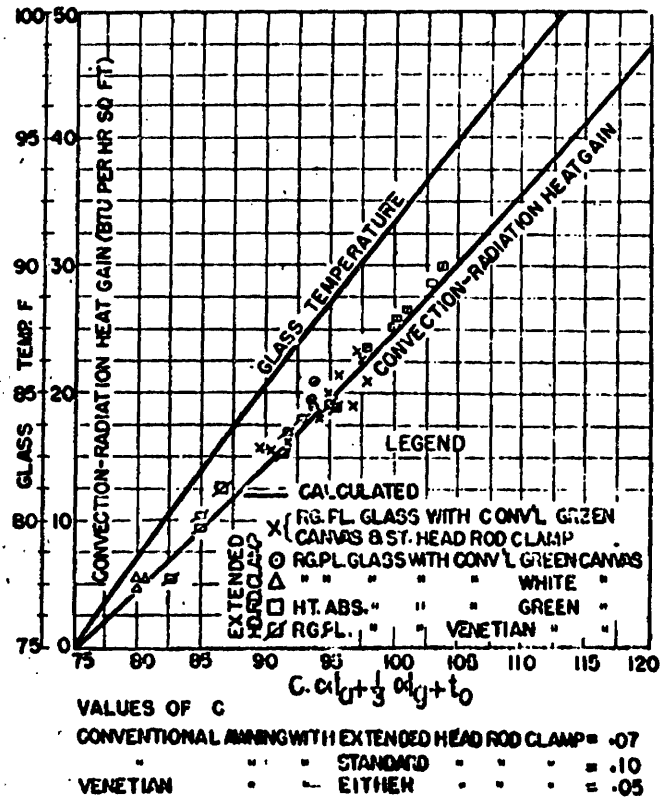

FIGURE 5.—Convection-Radiation heat gain and glass temperature (for 75° F indoor temperature)

As just indicated, Table 2 has been prepared for a window shaded by an awning having a 70 percent drop. If the awning drop is less than 70 percent, sunlit glass areas may exist in the lower section of the window, which have not been accounted for in Table 2. The height of this *lower section* is equal to the total glass height —1.4 x awning drop in feet. The sunlit area, if any, in the *lower section* can be estimated from the data in Table 3. This table gives the sunlit area in the lower section of a 3 x 5 ft window for 3 orientations, 3 different awning drops, and for various times of the day. The data may be applied to windows of other dimensions without serious error.

[3] Fraction of the height of the window covered by the awning (see Fig. 2).

TABLE 3.—SUNLIT AREA ON THE LOWER SECTION OF THE GLASS AS PERCENTAGE OF THE ENTIRE GLASS SURFACE

Orientation and Sun time	Awning drop					
	Conventional			Venetian		
	0.65	0.60	0.55	0.65	0.60	0.55
East/South:						
7 a.m. to 5 p.m.						
8 a.m. to 4 p.m.	4	8	13	7	14	22
9 a.m. to 3 p.m.	2	4	7	5	11	18
10 a.m. to 2 p.m.		2	5	2	5	7
East/west:						
7 a.m. to 5 p.m.	7	13	22	7	13	22
8 a.m. to 4 p.m.		7	15		7	15
9 a.m. to 3 p.m.						

Note: Based on 3 ft by 5 ft window, awning extension 5 in and 10 in for conventional and venetian-type awnings respectively.

If the foreground is of light color, the total heat gain in Table 2C should be increased by an amount approximately equal to the transmitted component of heat gain given in Table 2A for the type of canvas awning under consideration. The additional gain for a plastic awning is the same as for a similar canvas awning.

The data in Tables 2B and 2C are for an inside temperature of 75 F, and for outside temperatures as indicated in the table for different hours of the day. For temperature differentials other than those used in the table, the data may be corrected by adding or subtracting 1 Btu per (hr) (sq ft) for each degree of increase or decrease in temperature differential.

The data in Table 2 are for regular plate glass windows. However, the values can be applied with only small error to awnings in combination with ordinary window glass (data in Table 2C are about 1 to 3 percent low for ordinary window glass).

It was found that the total heat gains given in Table 2C could also be used for heat absorbing glass in combination with awnings provided the sunlit portion of the glass is not large. The reduced transmitted gains through the heat absorbing glass were largely offset by the convection-radiation gains resulting from higher glass temperatures.

The total heat gain through a window shaded by an awning having less than a 70 percent drop may, therefore, be determined by adding the 2 components of the gain which may be calculated as follows:

1. Heat gain through sunlit glass in the lower section of the window is equal to the sunlit glass area multiplied by the appropriate value from Table 2D.
2. Heat gain through the remainder of the window is equal to the area of the remainder multiplied by the appropriate value from Table 2C.

Example.—A southerly oriented window having an ordinary window glass 3 ft wide x 5 ft long is shaded by a conventional type of dark green canvas awning positioned to the wall with an extended head-rod clamp. The drop of the awning covers 55 percent of the entire glass height. Calculate the total heat gain through the window at 3 p.m. for: (1) 75 F indoor temperature and a normal dark foreground; (2) 80 F indoor temperature and a normal dark foreground; (3) 80 F indoor design temperature and a light color foreground.

Solution.—As the drop of the awning is less than 70 percent of the total glass height, the amount of sunlit area at the lower section, if any, should be determined. From Table 3, the sunlit area on the lower section is about 7 percent of the total glass surface. Hence, the sunlit area = 3 × 5 × 0.07 = 1 sq ft (approx.) and the shaded area = 3 × 5 − 1 = 14 sq. ft.

(1) Total heat gain for a 75 F indoor temperature and normal dark foreground: For the shaded area (from Table 2D, column 2): 14 × 36 = 504 Btu per hr; for the sunlit area (from Table 2D, column 2): 1 × 63 = 63 Btu per hr; total heat gain through the entire glass surface = 567 Btu per hr.

(2) Total heat gain for an 80 F indoor temperature and normal dark foreground: The air temperature difference for this example is 95 − 80 instead of the 95 − 75 differential on which Table 2 values for 3:00 p.m. is based. Allowing 1 Btu per (hr) (sq ft) correction per Fahrenheit degree difference in temperature differential, the reduction in the heat gain is 15 × 5 = 75 Btu per hr. Hence the total heat gain is 567 − 75 = 492 Btu per hr.

(3) Total heat gain for an 80 F indoor design temperature and a light color foreground: The additional heat gain due to the increase in the transmitted component of the heat gain, as taken from Table 2A, column 1, is 7 Btu per (hr) (sq ft). Hence the total heat gain is 492 + 7 × 15 = 597 Btu per hr.

DISCUSSION OF RESULTS

The mathematical analysis of the transmitted and convected-radiated components of the total heat gain through canvas-awning-shaded windows is in fairly good agreement with the experimental data, considering the difficulty experienced in securing desirable weather conditions, and in measuring the ground reflected and sky components of diffuse solar radiation and the low temperature radiation received from the surroundings.

Reflected solar radiation received by the underside of the awning and reflected from it makes some contribution to the transmitted energy depending upon the intensity of direct solar radiation reflected from the wall surface surrounding the window and the reflectance of underside surface of the awning. Re-reflections between glass and awning are negligible for materials having low reflectance. If the awning material itself transmits solar radiation, as in the case of the plastic awning, the solar energy transmitted through the glass due to this component can be a significant amount.

The convection-radiation component of heat gain, which is related to the amount of heat absorbed by the awning and glass, the outdoor temperature, and the venting characteristics of the awning, calculated for a combined outside convection-radiation conductance of 3 Btu per (hr) (sq ft) (F deg), correlates well with test data as shown in Fig. 5. The limitation to the general application of this relation to all kinds of awnings is the necessity of determining experimentally the constant C appearing in the abscissa of Fig. 5. This constant depends on the venting of the awning. The conventional type of canvas awning with the standard-head-rod clamp and the venetial type of awning may represent the 2 extremes in the venting of canvas awnings. Furthermore, at wind velocities above 5 to 6 mph, the warm air under the awning is carried away by the wind. For awnings having low solar absorptance on the outer surface, venting is not important.

To illustrate the order of magnitude of the solar heat excluded by an awning over a period of a day, the total heat gains through 100 square feet of regular plate glass with and without awnings, are compared in Table 4. These data were obtained from Tables 2C and 2D.

TABLE 4.—HEAT EXCLUSION BY AWNINGS*

Orientation of window and type of glass and awning†	Heat gain per 100 ft² glass surface (Btu per day)	Heat excluded by the awning	
		Btu per day	Percent
South:‡			
Regular plate glass alone	62,200	0	0
Glass with conventional-type white canvas awning	22,500	39,700	64
Glass with conventional-type green canvas awning	27,700	33,500	55
Glass with conventional-type dark green plastic awning	35,600	26,600	43
West:§			
Regular plate glass alone	84,200	0	0
Glass with conventional-type white canvas awning	19,500	64,700	77
Glass with conventional-type green canvas awning	23,900	60,300	72
Glass with conventional-type dark green plastic awning	34,800	49,400	59

*Data are for a window facing a dark foreground, an awning having a 70-percent drop, and for a typical design day (Aug. 1) at 40° north altitude.
†Awning mounted with extended-head-rod clamps.
‡For period from 8 a.m. to 4 p.m.
§For period from 12 noon to 5 p.m.

CONCLUSIONS

1. The performance of canvas awnings in reducing the total heat gain into a room varies with type, color, and venting of the awning, and with orientation and the time of day. The transmitted and convected-radiated components and the total heat gain for canvas awnings in combination with glass for East, South, and West orientations and for various hours of the day can be calculated from the data presented in Tables 2A, B, C, D, and Table 3.

2. An awning having a high solar absorbing surface on the outside, absorbs much of the solar radiation, causing its temperature and the temperature of air under it to rise, which in turn increases the glass temperature and the convection-radiation gain. On the other hand, the temperature of an awning having a low solar absorbing surface on the outside (white) will remain about the same as the outdoor air temperature. Thus, air under the awning is not appreciably heated and venting of such an awning is not important.

3. For wind velocities above 5 to 6 mph, venting of the awning is not important.

4. A light foreground in the presence of direct sunlight may approximately double the transmitted gain for a canvas awning-glass combination. For a plastic awning, the increase is approximately equal to the increase in transmitted gain for a canvas awning.

5. The use of heat absorbing glass instead of regular plate glass in combination with awnings causes only a few Btu per (hr) (sq ft) reduction in the total heat gain, provided the sunlit portion of the glass is not large.

6. Over a period of a day during which an awning prevents the direct sun from falling upon the glass, on a southern exposure, 55 to 65 percent of the heat gain through the window is excluded by a canvas awning, and on a western exposure, the saving is 72 to 77 percent.

ACKNOWLEDGEMENT

The authors acknowledge with thanks the suggestions and guidance of the members of the Technical Advisory Committee on Heat Transfer through Fenestration and the assistance and helpful criticism of the ASHAE Research Laboratory Staff.

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Appendix A

Solar Radiation Falling Upon the Glass Surface Under the Awning

Consider an awning and glass assembly, in which the awning shades all of the glass surface so that no direct beam falls upon the glass, and the awning material is opaque to solar radiation. The solar radiation received by the glass surface is largely due to the following components:

1. Ground-reflected and sky diffuse solar radiation entering through the openings of the awning and falling upon the glass surface.
2. Ground-reflected and sky diffuse solar radiation entering through the openings, and after being reflected from the underside surface of the awning, falling onto the glass surface.
3. Solar radiation reflected from the wall surrounding the window onto the underside of the awning, and in turn from the awning onto the glass.

The amount of re-reflected radiation between the glass and awning was relatively small, and was considered negligible.

In order to evaluate the foregoing quantities, the glass surface was arbitrarily divided into 2 sections:

Section 1.—Glass surface above the lower edge of the awning.

Section 2.—Glass surface below Section 1.

The amount of solar radiation falling upon each section was calculated in the following manner:

(*a*) Solar radiation falling upon Section 1 of area (A_1) consisted of the following manner:

1. Ground-reflected solar radiation entering through the lower opening of area (A_3), $I_{GV}A_3F^4_{3-1}$.

[4] Shape factors in Appendix A are all for a quarter sphere.

2. Diffuse radiation from the sky entering through the top opening of area (A_6), $I_{SV}A_6F_{6-4}$.

3. Diffuse solar radiation both from the sky and that reflected from the ground entering through the side opening of area (A_7), $(I_{GV}+I_{SV})\ A_7F_{7-1}$.

4. Diffuse solar radiation entering through the lower, top and side openings and falling upon the underside of the awning of area (A_4), from where it is reflected onto Section 1 of the glass. $[I_{GV}A_3F_{3-4}+I_{SV}A_6F_{6-4}+(I_{GV}+I_{SV})\ A_7F_{7-4}]R_4F_{4-1}$.

(b) Solar radiation falling upon Section 2 of area (A_2) consisted of the following components:

NOMENCLATURE

A=surface area, square feet.

C=constant used in determining convection-radiation heat gains (Fahrenheit) (hour) (square foot) per Btu.

CR_{gl}=convection-radiation heat gain from the glass into the room, Btu per (hour) (square foot).

E=Stefan-Boltzmann constant multiplied by the temperature of the surface in Fahrenheit degree absolute to the fourth power, Btu per (hour) (square foot).

F=shape factor, dimensionless.

h_c, h_r, h_{cr}=surface conductance for convection, radiation, and convection-radiation, Btu per (hour) (square foot) (Fahrenheit degree).

H=mixing coefficient, Btu per (hour) (Fahrenheit degree).

I_{dV}, I_{DV}=intensity of total diffuse and direct solar radiation, on a vertical surface, Btu per (hour) (square foot).

I_{SV}, I_{GV}=intensity of sky-diffuse and ground-reflected solar radiation on a vertical surface, Btu per (hour) (square foot).

I_{dH}, I_{DH}=intensity of total diffuse and direct solar radiation on a horizontal surface, Btu per (hour) (square foot).

I_{DN}=intensity of direct solar radiation normal to the sun beam, Btu per (hour) (square foot).

αI_a, αI_g=solar energy absorbed by the awning and glass, Btu per (hour) (square foot).

t=temperature, Fahrenheit.

t'_o=temperature of air under the awning, Fahrenheit.

R=reflectance, dimensionless.

T=transmittance, dimensionless.

β=altitude of air above a horizontal plane, degrees.

Subscripts

i, o—refer to inside and outside.

a, g—refer to awning and glass.

1. Diffuse solar radiation from the sky and reflected solar radiation from the ground, $[(I_{GV} + I_{SV})1 - F_{2-3})]\ A_2$.

2. Diffuse solar radiation reflected from the underside of the awning of area (A_4), $[I_{GV}A_3F_{3-1} + I_{SV}A_{3-1} + (I_{GV} + I_{SV})\ A_7F_{7-1}]\ R_1F_{4-1}$.

Furthermore, the underside of the awning received solar radiation reflected from the wall surface surrounding the window, which, in turn was reflected onto the entire glass surface. This was

$$(I_{DV} + I_{dV})\ R_{wall}\ A_4F_{4-wall}\ R_4F_{4-(1-2)}$$

The sum of the foregoing components of solar radiation represents the total diffuse solar radiation falling upon the entire glass surface. The solar energy transmitted through per unit area of the glass surface was obtained by dividing this sum by the area of the glass surface and multiplying it by the transmittance of glass for diffuse solar radiation.

APPENDIX B

THE GROUND-REFLECTED COMPONENT OF SOLAR RADIATION

Intensity of the ground-reflected solar radiation falling upon a vertical surface depends largely upon the intensity of solar radiation on the foreground and the reflectance of the foreground. The intensity of solar radiation on a horizontal foreground irradiated by the sun is $(I_{dH} + I_{DN} \sin \beta)$.

From the pyrheliometer measurements of the ground reflected solar radiation falling upon the vertical surface, it was found that, for the usual dark surroundings in front of the calorimeter, (I_{GV}) correlated approximately with the following relation:

$$I_{GV} = 0.06\ (I_{dH} + I_{DN} \sin \beta)$$

This relation was then used in computing the ratio (I_{GV}/I_{dV}), for calculations of the transmitted component of the heat gain. The values of I_{dH}, I_{DN} I_{dV}, and β were taken from The Guide.

Appendix C

Convection-Radiation Heat Gain From the Glass into the Room

Equating the rate of solar energy absorbed per unit area of glass surface to the convection-radiation losses from the same surface:

$$_{\alpha}I_g = CR_{gi} + h_{co}\,(t_g - t'_o) + h_{ro}\,(t_g - t_a)\,F_{g-a} + h_{ro}\,(t_g - t_o)\,(1 - F_{g-a}) \quad \text{(C-1)}$$

where

CR_{gi} = the convection-radiation gain from the glass into the room.

Writing a similar heat balance equation for the awning:

$$\alpha I_a = h_{co}\,(t_a - t_o) + h_{co}\,(t_a - t'_o) + h_{ro}\,(t_a - t_o)\,F \quad \text{(C-2)}$$

where

$$F = 1 + F_{a-1} + F_{a-\text{opening}}$$

For the purpose of this equation, the temperatures of the glass and the surroundings were assumed to be equal to the temperature of the outside air, t_o.
Solving for t_a in Equation C-2 and substituting in Equation C-1,

$$\left(\frac{1}{h_{cro}}\right)(CR_{gi}) + t_g = \frac{1}{h_{cro}}\,{}_{\alpha}I_g + \left[\frac{h_{ro}F_{g-a}}{h_{cro}(2h_{co} + Fh_{ro})}\right]{}_{\alpha}I_a$$
$$+ t_o\left(\frac{h_{ro}}{h_{cro}}\right)\left[1 - \frac{h_{co}F_{g-a}}{2h_{co} + Fh_{ro}}\right]$$
$$+ t'_o\left(\frac{h_{ro}}{h_{cro}}\right)\left[1 + \frac{h_{ro}F_{g-a}}{2h_{co} + Fh_{ro}}\right] \quad \text{(C-3)}$$

where, $h_{cro} = h_{co} + h_{ro}$

Taking the combined convection-radiation conductance,[5] h_{cro} as 3 Btu per (hr) (sq ft) (F deg) and the radiation conductance,[6] h_{ro} as 1.2 Btu per (hr) (sq ft) (F deg), and substituting the numerical values of the shape factors, Equation C–3 may be reduced to the following form for conventional type awnings:

$$1/3\ CR_{gi} + t_g = (0.05\ \alpha I_a + 1/3\ \alpha I_g) + 1/3\ t_o + 2/3\ t'_o \quad \text{(C–3a)}$$

In this equation, other conditions being the same, t'_o is a function of the rate of removal of the hot air collected under the awning. Assuming that the air under the awning receives heat by convection from the awning only, and that this heat is carried away by air circulation only, the heat balance Equation C–4 can be written:

$$A_a h_{co}(t_a - t'_o) = H(t'_o - t_o) \quad \text{(C–4)}$$

where H is determined from the test data. t'_o was solved by eliminating t_a from Equations C–2 and C–4. Substituting the value of t'_o thus obtained in Equation C–3a and putting in the respective values of the constants, Equation C–3a becomes as follows:

$$1/3\ CR_{gi} + t_g = (C\alpha I_a + 1/3\ \alpha I_g) + t_o \quad \text{(C–3b)}$$

[5] Calculated values based on $h_{cro} = 3$ agreed well with experimental values.
[6] For the temperature ranges encountered during the tests for the glass and awning, and taking into consideration the emissivities of these surfaces, an average value 1.2 Btu per (hr) (sq ft) (F deg) was taken for the radiation conductance.

The value of C was found to vary with the type of awning, the type of head-rod clamp, and the wind velocity. Values determined from experimental results, are as follows: For conventional awnings and wind velocities up to approximately 5 mph, C equals 0.07 and 0.10 for extended and standard type head-rod clamps respectively. For wind velocities above 5 mph, $C=0.05$ for either type of head-rod clamp. For venetian type of awnings, a value of 0.05 may be used for any wind velocity and any type of head-rod clamp. Although weather conditions permitted the collection of only a few data at wind velocities below 2 mph, it is believed that the values may be applied without serious error for such conditions.

From Reference 3,

$$CR_{gi}=0.27(t_g-t_i)^{0.25}(t_g-t_i)+0.938(E_g-E_i) \qquad \text{(C-5)}$$

From equations C–3b and C–5, the convection-radiation gains were calculated for an inside temperature of 75F, and were plotted in Fig. 5 as a function of the right hand term of Equation C–3b.

Discussion

D. J. Vild, Toledo, Ohio (written): The authors have succeeded in presenting in an easily understandable form a paper dealing with complex heat-transfer relationships. Data contained in this paper have been needed by residential air-conditioning engineers for many years and every attempt should be made to interpret it for inclusion in the ASHAE Guide as soon as practical.

It is interesting to note the heat gain due to transmitted and absorbed solar energy is virtually constant for wide range of solar azimuth and altitude for the various canvas awnings investigated. Solar azimuth has no significant effect between 0 and 60 degrees and solar altitude has little effect in cases where the shadow line reaches the bottom of the glass. Also with the use of extended head rod clamps the heat gains are essentially equal with either conventional or Venetian-type awnings. These results are not altogether startling and are mentioned as items to be considered in preparing the data for The Guide. Heat gains through awnings cannot be interpreted in the form of shade factors, such as are used for louvered shading devices, and other means as just mentioned must be used. Supplementary information regarding the profile angles necessary to determine the sunlit glass areas would be needed for various latitudes, time of year, and orientation. With the addition of the heat transfer due to air-to-air temperature difference the total heat gain may be determined for all seasons. The importance of calculating air-conditioning loads for all times of the year should be stressed. The practice of designing air conditioning for an August 1 design day without a check of fall and winter cooling loads frequently results in the choice of undersized equipment.

A question arises regarding the determination of the values for the abscissa of Fig. 5. How is the quantity αI_s determined in a practical application? With variously oriented surfaces of the awning and hence variations in incident solar radiation, is this not an extremely difficult value to calculate? Also, how effective are the various awnings in reducing the heat gain on exposures oriented away from the sun and how effective are they in reducing the heating load?

W. P. Chapman, Milwaukee, Wisc., (written): The concise logical presentation of this paper makes it easy to understand and to apply. I believe, therefore, that the authors, in their attempt to simplify the presentation as much as possible, certainly have anticipated my comment. At any rate I would like them to comment on the following suggestion.

The information presented in Table 4 of this paper indicates that the effectiveness of awnings might possibly be explained by the following equation:

$$Q_a=K_aQ_w$$

where

Q_a=heat gain through the window with an awning, Btu per (hr) (sq. ft.)
K_a=awning shading factor, dimensionless
Q_w=heat gain through a bare window (that is, without awning) Btu per (hr) (sq. ft.).

If such an equation is feasible then I would suggest that the values for K_a be given in a table arranged in columns and rows. The rows could be the values

of the solar altitude going from 0–90 degrees and the columns could be for wall-solar azimuth going from 0–90 degrees. The values of K_a would lie between zero and one. The azimuth would depend upon the wall orientation and the time of day; whereas, the altitude would be a function of the date and geographical location of the site.

Accompanying such a table could be a set of charts similar to those published by Irving F. Hand of the U.S. Weather Bureau in Air Conditioning, Heating and Ventilating, October 1948. Mr. Hand's charts enable the reader to determine the solar altitude and azimuth for any minute of the day for any point in the United States.

I would think that the advantage of such a table and the equation as mentioned would be that all of the data previously given for various types of glass could be modified to allow for the particular awning to be used. This would require a separate table for each awning, but in this case the tables are small and only 5 would be needed to present the data given in this paper.

Authors' Closure (Mr. Ozisik): We are grateful for the comment on this paper.

Mr. Vild pointed out in his discussion that the term αI^a, which is the solar energy absorbed by the awning, is difficult to evaluate and we agree. The reason that the equation of solar energy absorbed was not included is that it is too complex to be of practical use. However, for the solar design conditions given in The Guide and for a solar absorptance of unity on the outer surface of the awning, αI_a can be expressed as a function of the total incident radiation falling on the vertical wall having the same orientation as the window and the incidence angle of the solar beam on the wall. This relation is as follows:

Incidence angle:

	$\alpha I^a/(I_{DV}+I_{dv}$
0	0.52
20	.66
40	.90
60	1.22
80	2.15

and for a given awning, these should be multiplied by the solar absorptance of the awning.

The effectiveness of awnings in reducing the heat gain on exposures oriented away from the sun is about 65 percent of that transmitted through the glass alone.

In regard to the effect of awnings in reducing the heat loss in winter time, we do not have any data on heat losses with canvas awnings. However, we have run tests on roller shades for both winter and summer conditions; and believe that the curve of Fig. 5 for convection-radiation heat gain can be extended downward without a serious error in determining the heat losses under winter conditions.

Mr. Chapman pointed out a simple method for presenting complex data as a function of the total gain through the glass alone and a constant varying with the solar altitude and solar azimuth. We shall consider this excellent suggestion to simplify future presentations.

Canvas Awnings Stop Up to 77 Percent of Sun's Heat

"Over that period of a day during which an awning prevents the direct sun from falling upon the glass, on a southern exposure, 55 to 65 per cent of the heat gain through the window is excluded by a canvas awning, and on a western exposure, the saving is 72 to 77 per cent."

This is one of many conclusions which have come as a result of research performed by the American Society of Heating and Air Conditioning Engineers on the heat protection offered by canvas awnings. ASHAE scientists, subsidized in the project by the Canvas Products Associated International and the Canvas Awning Institute, Inc., have released their findings in a report entitled "Heat Gain Through Windows Shaded by Canvas Awnings." According to William C. Brooks, CPAI president, the findings open up vast new areas of sales promotion for that segment of the canvas products industry which is concerned with the sale of fabric awnings. In addition, Mr. Brooks states that for the first time architects and engineers will be in possession of facts to aid them in specifying the use of fabric sun-shading products on buildings and in conjunction with air conditioning equipment.

Design data on heat gain through awning-glass combinations for 75F indoor temperature. Figures contained in this table are the data which air conditioning engineers will actually use to determine heat gain in Btu's per hour through any particular window at any outdoor temperature and ultimately to indicate the reduction in heat gain which a particular type of awning can be expected to achieve.

Table 2—Design data on heat gain[a] through awning-glass combinations for 75F indoor temp.

Orientation	Sun Time	Outdoor Temp.	Table - 2A Transmitted			Table - 2B Heat Gain With Awnings Correction—Radiation							Table - 2C Total Gain							Table - 2D Total Heat Gain Glass Only Type Glass		
			Awning Type Used																			
			Conventional		Venetian	Conventional				Venetian	Conventional						Venetian	Reg Plate (b)	Ord. Window (c)	Heat Absorb. (d)
			Canvas	Plastic	Canvas	Canvas			Plastic	Canvas	Canvas			Plastic			Canvas			
						Green	Green	White	Green	Green	Green	Green	White	Green	Green		Green			
						Type Head Rod Clamp					Type Head Rod Clamp									
						Standard	Extended				Standard	Extended								
EAST	7AM	73	6+9*	31+9*	9+8*	13	9	4	8	8	28	24	19	48	25	185	199	135
	8	77	8	34	11	17	13	6	12	12	33	31	14	50	33	192	211	142
	9	80	9	37	11	21	17	9	16	15	50	26	18	53	26	172	187	129
	10	83	9	30	12	24	19	12	18	17	33	28	21	48	29	124	137	94
	11	87	10	22	12	26	22	16	20	20	36	32	26	42	32	67	73	54
	12	90	9	13	10	26	22	18	21	21	55	51	37	34	31	32	33	27
SOUTH	6AM	77	6	18	7+4*	10	10	4	7	7	16	16	10	17	18	19	20	14
	9	80	7	16	9+6*	16	15	8	10	11	23	20	13	26	26	44	48	34
	10	83	9	21	11+2*	21	18	12	16	16	50	27	21	37	29	73	78	57
	11	87	9	34	11	27	23	16	21	21	56	32	25	45	32	96	106	75
	12	90	10	29	12	30	26	19	25	25	40	56	29	54	37	107	115	84
	1PM	93	9	54	11	34	30	25	28	28	45	39	32	52	39	103	110	82
	2	94	9	21	11+2*	34	30	25	28	28	43	39	32	49	41	85	90	69
	3	95	7	16	9+6*	33	29	24	26	27	40	36	31	42	42	59	63	50
	4	94	6	10	7+4*	28	26	21	24	24	34	32	27	34	35	36	37	32
WEST	12	90	9	15	10	26	23	18	21	21	33	32	27	34	31	32	33	27
	1PM	93	10	23	12	33	29	22	27	27	45	39	32	49	39	73	77	61
	2	94	9	30	12	37	32	24	30	30	46	41	33	60	41	136	147	107
	3	95	9	37	11	39	34	25	32	31	48	43	34	69	42	189	204	148
	4	94	8	38	11	36	32	24	31	30	44	40	32	69	41	210	228	164
	5	93	6+7*	31+9*	9+8*	33	29	22	28	27	48	44	37	68	44	202	217	157

NOTE: Data obtained from a 44 in. square regular plate glass window facing a dark foreground and shaded by an awning having a drop of 70 degrees.
Values calculated for a combined outside conductance of 3 Btu per (hr) (sq ft) (F).

[a] All heat gains are in Btu per (hr) (sq ft).

[b] Regular plate glass, with transmittance for direct solar radiation (normal) 0.77.

[c] Ordinary window glass, with transmittance for direct solar radiation (normal) 0.87.

[d] Heat absorbing glass, with transmittance for direct solar radiation (normal) 0.41.

[e] Addition due to direct sun on the glass.

The actual experiments, conducted at ASHAE headquarters in Cleveland, Ohio, were performed under simulated household conditions. Awnings, of a type mentioned later, were affixed to 44¼ by 44¼ inch panes of regular and heat absorbing glass. The two types of glass, in turn, were mounted in wooden housings that approximated the side of a house. A calorimeter was used to measure the various heat gains, and other scienific instruments were present to measure wind, temperature and solar radiation.

Awnings used in this experiment were of solid colors, some equipped with standard head rod clamps and others with ¾-inch extension head rod clamps to observe the effect of venting at the top of the awning. The awnings used were of the following style, color and fabric:

1. Conventional type, canvas, outside dark green, underside grey-green.
2. Conventional type, canvas, outside white, underside grey.
3. Venetian type, canvas, outside dark green, underside grey-green.
4. Conventional type, plastic monofilament fabric, outside and underside dark green (woven).

The glass used in the experiments was a quarter of an inch thick. Some experiments were conducted with regular plate glass and others with heat absorbent glass.

To understand the tenor of this research, it is necessary to understand how heat is transferred through a window. A window receives direct solar radiation from the sun, diffuse or scattered solar radiation from the sky, reflected solar radiation from surrounding objects such as sidewalks and the ground, and low-temperature radiation, both from the sky and the surroundings. If there is no shade of any kind on the window to prevent the sun's direct rays from falling upon the glass, a large fraction of direct, diffuse and reflected solar radiation passes directly through the glass into the room, a smaller fraction is reflected by the window, back into the atmosphere, and the remainder is absorbed by the glass. The fraction of solar radiation regardless if it's direct, diffuse or reflected, which passes directly through the glass, is a heat gain component called "transmitted solar energy."

The solar radiation that is absorbed by the glass causes an increase in the temperature of the glass until an equilibrium is reached between the amount of heat the glass absorbs and the amount that it dissipates. When this equilibrium is reached, the glass temperature remains constant and additional solar heat which touches the glass is partly passed out into the atmosphere and partly passed into the house. The heat that is passed into the room is called, "convection-radiation heat gain."

Transmitted solar energy heat gain and convection-radiation heat gain are the two terms which explain how heat enters a room through unprotected windows.

Knowing the amount of heat transmitted through an unprotected window, researchers accumulated and tabulated the amount of heat that entered a window equipped with the aforementioned fabric awnings. They found that in the presence of an awning which is opaque or non-transparent to solar radiation. . . if no direct rays fall upon the glass surface, the ground reflected radiation entering through side and bottom openings of the awning, and the diffuse sky radiation coming from that portion of the sky "visible" by the glass under the awning, form the major portion of the transmitted heat gain that passes directly through the glass.

They also found that if the awning has a high surface temperature, it tends to increase the temperature of the glass, both by radiation and by warming the air under the awning. Therefore, in the presence of the awning, the glass temperature is determined by the temperature of the awning and the temperature of air under the awning. If the temperature of the awning and the air under it is high, the temperature of the glass will be high and the amount of heat transmitted by convection-radiation into the room will be greater.

With this knowledge, the researchers tried awnings of different colors to find the one that absorbed the least heat. They found that the awning with the white outer surface was least heat absorbent and, therefore, white or light colored awnings are more effective in reducing the temperature on the inside of a room.

Another interesting finding of the researchers was that the conventional type of awning with ends was more effective at lowering room temperature than the venetian type without ends. Test supervisors concluded that this difference was due to the fact that more reflected solar radiation and diffused solar radiation entered the open ends of the venetian type awning, thereby increasing the temperature of the glass.

It was further determined that an awning having a low solar absorbing surface on the outside (white) will remain about the same as the outdoor air temperature. Thus, air under the awning is not appreciably heated and venting of such an awning is not important. . . contrary to much previous industry thought. The importance of venting an awning increases minutely with the degree to which the awning absorbs heat. For instance, it is more important to vent a dark-colored awning than a light one, but the difference venting makes in the temperature of the glass does not make it a vital factor. For wind velocities above 5 to 6 mph. venting of the awning is even less important, since the wind carries away the trapped warm air under the awning.

Experiments showed that a light foreground in the presence of direct sunlight may approximately double the transmitted heat gain for a canvas awning glass combination. This is due to the fact that a light foreground reflects heat directly into the window. For a plastic awning, the increase is approximately equal to that of a canvas awning.

TABLE 4.—HEAT EXCLUSION BY AWNINGS* HOW MANY Btu's PER DAY OF HEAT AWNINGS ON SOUTH AND WEST FACING WINDOWS CAN BE EXPECTED TO EXCLUDE ARE THE DATE RECORDED IN THIS TABLE

Orientation of window and type of glass and awning†	Heat gain per 100 ft² glass surface (Btu per day)	Heat excluded by the awning	
		Btu per day	Percent
South:‡			
Regular plate glass alone	62,000	0	0
Glass with conventional-type white canvas awning	22,500	39,700	64
Glass with conventional-type green canvas awning	27,700	34,500	55
Glass with conventional-type dark green plastic awning	35,600	26,600	43
West:§			
Regular plate glass alone	84,200	0	0
Glass with conventional-type white canvas awning	19,500	64,700	77
Glass with conventional-type green canvas awning	23,900	60,300	72
Glass with conventional-type dark green plastic awning	34,800	49,400	59

*Data are for a window facing a dark foreground, an awning having a 70-percent drop, and for a typical design day (Aug. 1) at 40° north altitude.
†Awning mounted with extended-head-rod clamps.
‡For period from 8 a.m. to 4 p.m.
§For period from 12 noon to 5 p.m.

The use of heat absorbing glass instead of regular plate glass in combination with awnings causes only a slight reduction in the total heat gain, provided the sunlit portion of the glass is not large.

The plastic woven monofilament awning proved somewhat less effective in reducing heat transfer because its more loosely woven nature allowed a fraction of the solar radiation to pass through it onto the surface of the window.

CANVAS PRODUCTS FABRICATIONS—PLEASE NOTE

From the point of view of the canvas products industry, the most important finding of the research program conducted in Cleveland is that a fabric awning very substantially reduces the heat gain through a window. Just how much is rather startling. For example on a southern exposure, 55 to 65 per cent of the heat gain through the window is excluded by a fabric awning, and on a western exposure the awning effectively blocks out 72 to 77 percent of the solar energy components represented by the term heat gain.

As a result, not only do we know (as we always have) that fabric awnings make a house cooler, we know almost exactly how much heat they will control, under specific conditions. What's more, we have positive proof that awnings and air conditioning equipment are as inseparable as shoes and socks. As a matter of fact, we now can prove to engineers and architects that they ought to use sunshading in connection with residential and commercial air conditioning equipment to avoid wasting a client's money.

Just as important is the fact that we also have a means for selling fabric awnings to Mrs. Housewife later in the season at a time when the awning business is thought to be over.

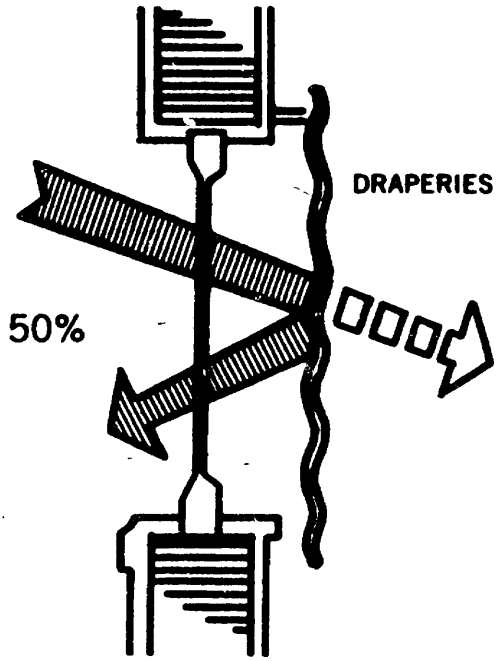
SHADE WINDOWS, ESPECIALLY FROM DIRECT SUN

The daytime heat gain through windows, which typically compromise 15 to 30 percent of the exterior wall area of a house, puts a heavy load on air-conditioning equipment. Windows having ordinary glass transmit most of the radiant solar energy to which they are subjected and much of the heat from warmer outdoor air.

All windows, especially those exposed to the sun, should be shaded by one or more of the following means (percentage reductions in heat gain are compared with untreated ordinary glass windows):

Blinds, draperies, etc.—Such devices can reduce heat gain through windows by as much as 50 percent. Their effectiveness depends on how well they reflect solar radiation back through the window. They should be light in color and opaque. And they should be drawn when sunlight enters your rooms—particularly in rooms not being used for the moment.

Special glasses—Heat-absorbing and reflecting glasses can reduce solar heat through windows by 40 to 70 percent. These glasses have the advantage of doing the job while not interfering appreciably with the view.


DRAPERIES
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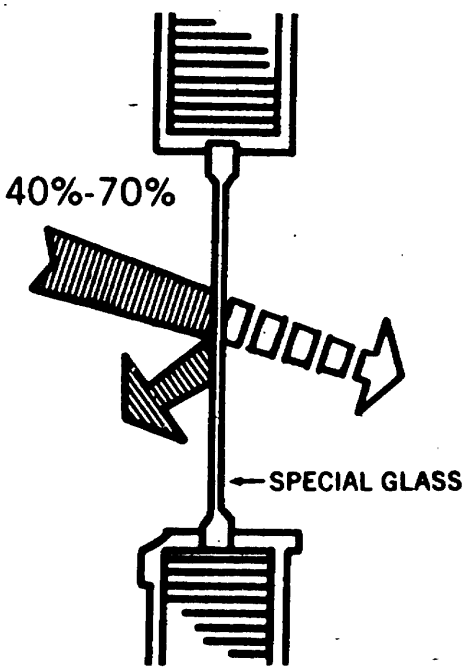
40%-70%
SPECIAL GLASS

Awnings, overhangs, etc.—By far the most effective way to reduce solar heat gain is through the use of external shading devices such as awnings, overhangs, side fins, louvered sun screens and—yes—trees. These can reduce solar heat gain by as much as 80% if properly designed. A word of caution: awnings and overhangs should be designed so as not to trap hot air in the window area.

The costs of these means of coping with heat gain vary, and your decision to adopt certain improvements would probably depend on an array of factors going beyond considerations of thermal comfort alone. You might, for example, decide to plant a tree not only for increased thermal comfort but to attract songbirds and to view its spring blossoms, autumn foliage and winter tracery.

Keep storm windows in place during the air-conditioning season on all windows except those to be used for ventilating. Storm windows—and insulating glass windows as well—may not stop the penetration of solar radiation but they form significant barriers to the transfer of outdoor air heat to the indoors.

STATEMENT OF G. R. MUNGER, AIR-CONDITIONING AND REFRIGERATION INSTITUTE

The Air-Conditioning and Refrigeration Institute (ARI) is a trade association whose members manufacture more than 90 percent of all U.S.-made air-conditioning and refrigeration equipment (other than household appliances such as room air-conditioners, dehumidifiers, refrigerators and freezers) and components which become a part of that equipment. Equipment manufactured by ARI member-companies which is within the scope of H.R. 8444 includes unitary (central residential) air-conditioners and heat pumps, central system humidifiers, and package terminal air-conditioners and central-station equipment used in commercial and multi-family installations.

ARI publishes rating standards for equipment within its product scope and administers programs through which participating manufacturers may certify the operating characteristics of their products. These certification programs date back to 1959, when this industry first established a voluntary program to insure consumers of accurate capacity ratings for central air-conditioning equipment. Today ARI administers 11 certification programs for such diverse products as unitary air-conditioners, heat pumps, transport refrigeration units, humidifiers and drinking water coolers.

Information derived from each certification program is disseminated to that part of the air-conditioning and refrigeration industry which uses that product. For example, designers and installers of central cooling systems are able to purchase equipment on the basis of energy efficiency and overall performance by referring to the ARI Director of Unitary Air-Conditioners and Heat Pumps. This Directory shows electrical input (expressed in watts) and cooling capacity expressed in Btuh, together with the energy efficiency ratio number (EER), for more than 6,700 different models of these products. (The EER number is calculated by dividing watts into Btuh at the standard rating condition.) The Directory, which is published twice a year, is supplied by ARI to over 30,000 engineers, builders, contractors, architects, utilities, government agencies and technical schools.

GENERAL VIEWS ON H.R. 8444

ARI is in agreement with the need for a national energy program as expressed in the findings and statement of purposes in Section 2. Our members are convinced, and for several years have been proceeding on the premise, that the United States faces an energy shortage, that effective measures must be taken to reduce the rate of growth of demand for energy, and that it is essential for the United States to carry out an effective conservation and efficiency program in all sectors of energy use.

Furthermore, we believe that in order to meet the energy goals set out in Section 3 of the bill, air-conditioning equipment must be manufactured, and systems designed and operated, so as to achieve optimum energy utilization.

We believe it is urgent to enact additional legislation which will encourage the use of more efficient energy-consuming devices, appliances and equipment. The tax provisions of R.R. 8444 are designed to do this, and while we will not comment

in detail on more than a few of these provisions, we believe that, in general, they can go far toward accomplishment of these goals.

TAX CREDITS WOULD ENCOURAGE MORE EFFICIENT EQUIPMENT

It is clear to ARI that the United States today faces a problem of crisis proportions: the problem of bringing about a transition from an era of cheap, abundant energy to a new era of relative scarcity of expensive energy supplies. This transition has started and must be pushed now, in order to avoid serious future shock to the Nation and to its economy.

Two solutions to this problem are clear: conservation of energy supplies available to us now, and development of new sources of energy in the futuse.

The President's energy plan proposes a number of measures to bring about conservation of our present supplies. H.R. 8444 provides a non-refundable income tax credit for insulation and "other energy-conserving component" expenditures for installations in or on the principal residence of the taxpayer. The credit is 20 percent of the first $2,000 of qualifying expenditures. Thus, the maximum credit would be $400.

Six items, in addition to insulation, are classed in H.R. 8444 as "other energy-conserving components." They are: more efficient furnace replacement burners, automatic flue dampers, electrical and mechanical intermittant furnace ignition systems, storm or thermal windows or doors, clock thermostats, and caulking or weatherstripping. There is also provision for items not identified which the Secretary of the Treasury, in the future, may specify as increasing the energy efficiency of a dwelling.

ARI believes that air-source and water-source heat pumps should be added to the list of "other energy-conserving component(s)" contained in H.R. 8444. It recommends that, like the other items in this list, this tax credit apply to taxable years ending on or after April 20, 1977, for expenditures made on or after that date and before 1983.

For reasons stated later in this presentation, we believe that the granting of this incentive is needed to call the energy-saving characteristics of heat pumps to the attention of prospective buyers, both for retrofit and new construction purposes, and is needed, furthermore, to offset the higher first cost of the heat pump as compared with other less efficient forms of electric heating which will be installed where new gas customers cannot be added.

BUSINESS ENERGY CREDIT FOR INSTALLATION OF HEAT PUMPS

Under H.R. 8444, a ten percent business energy tax credit (in addition to the investment credit provided under present law) will be given for investments by business in qualified property intended to reduce the amount of oil, natural gas or other energy consumed in heating or cooling a building or used in an industrial process.

The credit will be available for investments in qualifying property made after April 19, 1977, and before January 1, 1983. Where credits are generated by investments in alternative energy property, they can be applied against 100 percent of the taxpayer's income tax liability, rather than the 50 percent limitation which now is generally available.

Qualifying property for the business energy tax credit includes alternative energy property, an option for taxpayers who will be liable for the oil and natural gas use taxes, and for other types of property, i.e.: (1) expansion of cogeneration property installed in an existing facility; (2) advanced technology property which will use solar, geothermal or wind energy to provide heat, cooling or electricity; (3) such items of equipment as recuperators, heat wheels and energy control systems, which will recover waste heat and gases or otherwise reduce energy consumption, and also equipment to modify existing facilities to allow the use of oil or natural gas and at least 25 percent of some other substance in a combustor or to produce an industrial feedstock; and (4) equipment to recycle solid waste or to sort and prepare solid waste for recycling.

For purposes of the regular investment credit, equipment installed in connection with an existing building or industrial facility will be qualifying property through 1982.

ARI recommends that heat pumps be included in this list of qualifying property for the business energy property tax credit. The same reasons apply for business property as apply for residential property, as already stated.

NATURE OF THE HEAT PUMP

A heat pump contains several components: the compressor (a pump which circulates a fluid called the refrigerant); the outdoor heat exchanger, which absorbs or rejects heat from or to the outdoor air from the circulating refrigerant; the indoor heat exchanger which absorbs or rejects heat from or to the indoor air from the circulating refrigerant; and the switchover valve, which reverses the flow of the refrigerant.

The heat pump provides both heating and cooling by moving heat from where it is not needed to where it is needed. In winter, it removes heat from the outdoor air and uses it indoors. In summer, it moves heat from the indoor air, where it is not wanted, to the outdoors, where it can be "thrown away." (The water source heat pump works on the same principle with water serving the function of air in the air-source heat pump.)

The home refrigerator pumps heat in one direction only, removing heat from inside the cabinet and rejecting it into the kitchen. In the same manner that a refrigerator does this, an air-conditioning system takes heat from inside the home and rejects it outdoors in warm weather. A heat pump during its cooling cycle works in the same way but by the use of the switchover valve, it takes heat from outdoor air in winter and releases it inside the house. Because it simply moves energy, it provides heat at its point of use in a much more efficient manner.

Removing heat from the air is a surprising phenomenon for many people. At 20° F, the air feels cold, but its heat content is quite high. Many are surprised to learn that at 20° F there is still more than 85 percent of the heat in the air that is available at 100° F. Only when we reach absolute zero (–460° F) do we find no heat at all in the air.

DEVELOPMENT OF THE HEAT PUMP

A French scientist, Nicholas Carnot, first suggested the basic principle of the heat pump in 1824 as a part of his studies of the refrigeration cycle. Lord Kelvin continued to study the principle 30 years later, when he proposed that refrigerating equipment could be used for heating. Investigations like these continued for the next 80 years.

It was not until the mid-1930's, however, that American industry became seriously interested in the possibility of using the heat pump principle in a commercially viable product. After World War II, development was continued, largely addressed to the need for heat pumps in a unitary package, i.e. a refrigeration system which is factory-engineered and factory-built, then shipped to the field in one or two assemblies. Unitary heat pump packages were first offered for sale in 1952, and the product started a slow climb in acceptance.

ENERGY SAVING ATTRIBUTES OF HEAT PUMPS

While today's home owners and even many of today's commercial builders do not always understand the energy-saving attributes of heat pumps, these attributes are clearly recognized by many sophisticated buyers. An industry analysis of the progression of the 100 units of fossil fuel through the home, dealing either with natural gas or oil, shows that in the direct combustion of this fuel, five percent of the energy is lost in distribution and 38 percent is lost in the combustion process, leaving 57 units (or 57 percent) delivered to the home as useful heat energy.

If the same 100 units of energy are delivered to an electrical power generating plant, 67 units are lost in power generation. Ten percent of what is generated is lost in distribution, leaving 30 units of energy finally delivered to the home.

When we examine the average seasonal performance factor for a heat pump, analyzed on a national basis, we find this factor is approximately 2.0. This means that 30 units of energy are absorbed from the outdoor air and added to the 30 units of energy delivered to the home. This yields 60 units of energy delivered as useful heat.

Overall, fossil-fuel direct combustion and the electric heat pump have about the same utilization efficiency of approximately 60 percent. Electric heat with the heat pump compares favorably with the direct combustion of fossil fuels from a utilization-of-natural resources viewpoint. The advantage to electric power generation and heat pump systems is that electric power can be generated from many sources.

Most electrical power is generated from fuels in abundant supply, such as coal, nuclear and hydro; the city of St. Louis, Missouri, however, uses garbage. Many of the utilities still using oil or natural gas for power generation are in the process of converting to coal or another more available fuel.

By using electricity, it is clear, we can use whatever natural resource is most available and least expensive.

We believe that the heat pump is a highly efficient way to use electricity for heat—by factors of up to 2.8 to 1 over resistance heating—and that it is efficient, too, for cooling. If the homeowner and the commercial builder can come to understand this efficiency, the first-cost advantage which other methods of heating have over the heat pump may be overcome. If this recognition comes as a result of recognition by the government, a substantial step by the government toward solution of the energy problem will have been taken. We are convinced that the residential and business tax credit for the installation of heat pumps is a most effective way to provide this recognition.

TRENDS IN HEAT PUMP MARKETING

Since the commercial introduction of the heat pump, it has grown in acceptance. The past few years, in particular, have shown promising growth.

ARI statistics show the following trends, during the years 1953–1976, for shipments of unitary heat pumps, single package and split systems, to domestic and export destinations:

Year:	*Shipments of heat pumps*
1953	986
1954	1,900
1955	3,551
1956	4,745
1957	10,163
1958	25,461
1959	40,907
1960	47,501
1961	51,043
1962	61,813
1963	76,380
1964	76,785
1965	72,275
1966	82,217
1967	79,725
1968	88,500
1969	97,318
1970	97,687
1971	83,281
1972	97,600
1973	120,016
1974	138,583
1975	166,653
1976	324,272

In 1977, shipments are expected to reach 450,000 units.

The heat pump is receiving deserved recognition among builders as a desirable device for heating residential dwelling units. Edison Electric Institute, which represents investor-owned utilities throughout the United States, showed the following recent trends in installations of electric heating equipment, by type, expressed as a percentage of the total added:

Type	Percent of total added	
	1974	1975
Electric furnace	48.8	52.0
Baseboard	18.8	22.3
Heat pump	6.3	17.4
Ceiling cable	6.4	3.3
Wall unit	1.5	2.2
Packaged terminal unit	.8	.7
Others	17.4	2.1

It should be noted that, in just one year, this analysis shows heat pump installation growing from 6.3 percent to 17.4 percent of the total added.

It should also be noted that shipments of electric furnaces also have increased substantially. According to the U.S. Bureau of Census, shipments of electric furnaces rose from 252,335 in 1975 to 338,900 in 1976.

RECOGNITION OF HEAT PUMPS AT FEA

Public Law 94-163, as amended provides for a number of incentives to bring about the use of energy saving equipment in existing buildings and industrial plants. These incentives to conserve and improve efficiency in the use of energy can have an immediate and substantial effect in reducing the rate of growth of energy demand. Some of these incentives are authorized in Title III, Part C, of Public Law 94-163, where the development and implementation of energy conservation programs by States is authorized. The incentives given under this provision of law are classified as "energy conservation measures" and "renewable resource energy measures."

As one step in implementing this law, the Federal Energy Administration on July 25, 1977, issued its Final Rule establishing these measures. Among the items classified as "energy conservation measures" were the following: insulation for ceilings, walls, floors, pipes, roofs, ducts and hot water heaters; storm windows; caulking; more efficient lighting; mixing valves, flow restrictors; residential oil burners; HVAC control systems; high efficiency electric motors; and individual energy metering.

Air-source and water-source heat pumps were classified by FEA in this same Rule as "renewable-resource energy measures." Other items in this category were solar water heaters, solar space heating and cooling systems, solar process heating systems, solar powered pumps, solar electric dispersed photo-voltaic systems, and wind-powered generators and water pumps.

In issuing this rule, FEA determined that an air-source heat pump extracts a portion of the heat contained in the ambient air which has been heated by the sun outside a building and transfers it into the building, thereby using solar energy as a resource to heat the building.

Under this ruling, FEA will require an energy audit where a reverse-cycle heat pump is installed except where the installation replaces both electric resistance heating and air-conditioning. Where electric air conditioning is already in operation, FEA concluded that "it is highly likely there would be a net saving in energy cost attributed to the heating cycle performance of the heat pump."

During the comment period on this rule, FEA noted in the Final Rule, it has been suggested that reliability and repair costs of heat pumps should be questioned, FEA found, however, that maintenance and repair costs which can be reasonably anticipated are likely to be more than repaid by the energy saving resulting from replacing an electric resistance heating system with a heat pump.

Since the publication of the Final Rule, FEA has issued a Proposed Change in the Energy Measures List, in which it suggests that heat pumps should be classified not as "renewable-resource energy measures" but as "energy conservation measures. This change has not yet been made. If it should be made, the amount of incentive for using heat pumps would be somewhat decreased, but the recognition of heat pumps as capable of conserving energy would nonetheless stand. In this Proposed Change, FEA states that heat pumps are "an appropriate application to provide sufficient cost and energy savings to qualify for designation as an energy conservation measure." "Cost recovery is likely," FEA points out, "and in appropriate applications, the primary purpose criteria for an energy conservation measure are satisfied." FEA also finds in The Proposed Change that proper use of the heat pump will not result in an ineligible fuel conversion.

ARI points out that this recognition of the heat pump as an energy measure—whether "energy conservation" or "renewable-resource"—makes it clear that the Federal Energy Administration encourages consumers to purchase heat pumps for the purpose of saving energy.

ASSISTANCE IN CONSUMER EDUCATION

Public Law 94-163 provides, the Section 337, for a program to educate consumers and other persons with respect to "(1) the significance of estimated annual operating costs; (2) the way in which comparative shopping, including comparisons of estimated operating costs, can save energy for the nation and money for consumers; and (3) such other matters as the Administrator determines may encourage the conservation of energy in consumer products."

ARI believes that this consumer education program, which is now being implemented, should include analysis and discussions of estimated annual operating costs of one type of heating and cooling versus another type, in order that consumers may know how most effectively to spend their money in this vital function of their house. The law provides that publications, audiovisual presentations, demonstrations and regional and national conferences be used for this education of consumers.

If tax incentives for heat pumps are included in H.R. 8444, ARI recommends that the facts which support the inclusion of these incentives be publicized in the consumer education program authorized under Section 337.

TAX INCENTIVES FOR HEAT PUMP PURCHASES

It is very clear that the average buyer needs an incentive to purchase a heat pump, either on a retrofit or new construction basis. The following figures, furnished by the Gas Appliance Manufacturers Association, show estimated installed costs for conventional gas furnaces:

Type of furnace	Furnace size (Btu per hour)				
	80,000	100,000	120,000	150,000	200,000
Conventional furnace	$485	$540	$560	$675	$865
Deluxe furnace (with intermittent ignition device and 2-stage gas valve)	565	615	645	730	975
Deluxe furnace (with automatic vent damper, intermittent ignition device, 4-speed motor, permanent cleanable filter, printed circuit, 20-yr guarantee)	630	675	730	850	1,225

The first cost figure for a heat pump, corresponding to the above figures, is considerably higher than this. Herein we find a part of the problem. Since ARI collects no figures on cost or price charged, it requested the National Environmental Systems Contractors Association (NESCA) which represents installation contractors throughout the nation, to furnish estimated first-cost figures for the installation of heat pumps. These figures vary geographically, so NESCA has provided figures for four regions of the country.

ESTIMATED INSTALLATION COSTS OF HEAT PUMPS IN 4 SELECTED GEOGRAPHICAL REGIONS

Type of installation	East	Middle West	South	West
Retrofit	$1,700	$2,100	$2,000	$2,000
New construction	1,500	1,750	2,000	2,000

NEED FOR HEAT PUMP PURCHASE INCENTIVES

While heat pumps were first placed on the commercial market in the early 1950's, there was really no surge in consumer acceptance until the early 1970's, when it began to be widely recognized that the United States was entering an era of energy shortages.

A major threat to the acceptance of heat pumps by consumers in the 1960's had been the low first cost and relatively lower operating cost of the electric furnace. As a result of this, many potential heat pump purchasers had switched to electric furnaces. Even though energy usage was higher, the lower energy cost per kwh kept current monthly utility bills for the electric furnace in the competitive range.

In the 1970's, however, the downward trend in the cost of electric energy reversed as a result of the energy crisis, and then started to rise sharply. In many areas of the country, it became difficult or impossible to install heating units using natural gas, and the only alternatives became oil furnaces, electric furnaces and heat pumps. The cost of fuel oil also rose rapidly, and so the heat pump became a reasonable alternative for many customers.

As a result of these factors, shipments of heat pumps rose. As shown by the statistics above, shipments rose from slightly over 83,000 in 1971 to almost 325,000 in 1976.

These same ARI statistics have shown that in the first 25 years of the heat pump industry, over 1,800,000 unitary heat pumps have been installed. Some of these have been installed as replacements. If we consider an average life of 15 years, approximately 1,600,000 unitary heat pumps are in use today. Their reliability and energy-saving characteristics are well-established.

Yet, the higher first-cost remains a problem. The large builder and the homeowner who is retrofitting are likely to install the equipment which requires the lowest initial outlay. We see, therefore, that the $400 residential tax credit which we are advocating should be allowed to "other energy consuming components" would be very helpful in putting heat pumps on an approximate par with furnaces.

The other reason why a buyer should be given a tax incentive to purchase a heat pump is his lack of knowledge about the heat pump principle and about its major advantages. For generations fossil fuels have been used as the basic source of energy in heating homes, commercial and industrial installations. The buyer is now being asked to install a unit whose principles he seldom understands. A recognition that this principle, as used in equipment available on the market today, is in fact energy-conserving in nature would help to promote its use by consumers and a consequent saving in energy for the nation. If this recognition is made by the government, and if it is publicly announced and promoted, the consumer is much more likely to install this energy-saving device.

CONCLUSION

The Air-Conditioning and Refrigeration Institute appreciates this opportunity to present its views on the desirability of adding tax incentive provisions dealing with the heat pump to the Committee on Finance. If we can furnish any additional information, we stand ready to do this at the Committee's request.

Clark Oil & Refining Corp., Position Paper—Exemption for "Small" Refiners Under Crude Oil Equalization Tax

Clark Oil & Refining Corporaiton is a "small" and "independent" refiner as those terms are defined in the Emergency Petroleum Allocation Act of 1973. Despite that fact, Clark is unalterably opposed to a continuation of unwarranted and excessive preferential treatment to certain "small" refiners to the extreme competitive injury of other refiners and their customers including branded independent dealers, unbranded independent dealers, and other wholesale accounts.

If Congress is concerned that "small" refiners are at a competitive disadvantage and possible relief deserve to be heard and debated in the traditional manner before Congress. Clark suggests that evidentiary hearings concerning the economic costs, regionally and nationally, the competitive impact on the industry, and the requirement for continued special treatment for certain companies be convened to develop the need for such legislation. To do otherwise is a response to a very small segment of the refining industry which has benefitted excessively for several years from special interest legislation that received inadequate attention when passed by Congress in 1975. Clark urges Congress to reject this attempt to continue those excessive benefits into the forseeable future.

1. SENATE ACTION TO EXEMPT SMALL REFINERS IS PREMATURE AND WILL SHORT CIRCUIT FEA ACTION

Since Clark's position paper was developed for the House Ways and Means Committee, the Federal Energy Administration (FEA) has issued a contract to study the adequacy of the existing Small Refiner Bias as an incentive for operation of small refiners. That study is to provide a basis for future FEA action as to whether the benefits are excessive and as to whether competitive injury may result as a result of some refiners receiving as much as a 4 cents or 5 cents per gallon crude cost advantage over their competitors. That study is scheduled to be completed October 31, 1977. Any Senate action prior to that date would not be based on the evidence being developed by FEA. The House of Representatives

has apparently recognized that fact and has, therefore, called for an FEA study and legislative recommendation outside the scope of the National Energy Plan. Clark recommends that the Senate endorse that approach if it is convinced that action is required.

In the meantime, small refiners will continue to receive entitlements benefits over and above those received by major companies (and small companies such as Clark) since the Entitlements Program will not be eliminated, if at all, until 1980. That is certainly plenty of time to develop a well-conceived and orderly program if one is required.

2. LEGISLATIVE EXEMPTION FOR CERTAIN SMALL REFINERS MUST BE EVALUATED WITH OTHER LEGISLATED OR REGULATORY SPECIAL BENEFITS

At the same time that the Senate is considering an exemption for certain refiners from the COET, several other pieces of legislation which would treat small refiners in a privileged manner have also been enacted, or are being considered.

A. Offshore Production. The Outer Continental Shelf Lands Act as passed by the Senate reserves 20 percent of new offshore production for small or independent refiners. This is in addition to the government royalty oil of approximately 16 percent which is reserved for small refiners. Thus, a total of at least 36 percent of new oil developed offshore will be available at the market price at the point of delivery to non-major refining companies.

At the same time, if alternative bidding systems are utilized for OCS leases, that royalty oil may also be available to those same companies. It is possible that more than 50 percent of all new OCS production will be available to small refiners, many of whom already are at least semi-integrated and have their own crude production.

B. Clean Air Act—Lead Exemptions. The Clean Air Act of 1977 includes a provision setting relaxed lead in gasoline standards for small refiners. While projections indicate that leaded gasoline will constitute less of the fuels market in the 1980's, the relaxation of standards protects the leaded market for the small refiners and at least provides an extension of capital requirements worth about 10 percent per year on money that doesn't have to be spent by the benefitted refiners.

C. Cargo Preference Exemptions. The bill reported out of the House Merchant Marine and Fisheries Committee exempts small and independent refiners from the first 50,000 b/d or imported crude oil. The result is that some substantial refiners will be totally exempted while other small and independent refiners such as Clark will be less than 50 percent exempted. The exemption could mean a crude cost advantage over Clark of up to 67 cents per barrel for the exempted refiners.

In summary, Clark does not argue that the three abovementioned small and/or independent refiner amendments are unwarranted. Clark does argue that until those benefits are in place, no additional exemption (such as one from the COET) should be considered by Congress. To do otherwise could lead to further cost advantages which will threaten the stability of the refining-marketing segment of the industry and will threaten the competitive viability of non-benefitted refiners, jobbers, branded and unbranded dealers, and other fuels distributors.

3. THE COST IMPACT OF CONGRESSIONAL ACTION WILL RESULT IN SUBSTANTIAL LOSS OF TAX REVENUE FOR THE ADMINISTRATION'S ENERGY PLAN

Based on May 1977, FEA data, the small refiner bias and special relief will total more that $1,150,000,000 ($1.150 billion) on an annual basis. More than $897 million of that is directly due on an annual basis to perpetuation of the bias for existing refiners.

If the bias values are continued at the present rate, there will certainly be a further proliferation of very small refiners who will participate in the exemption. It is Clark's assumption, therefore, that the net loss in tax revenue based on May entitlements data would be almost 90 million dollars a month or 1.150 billion dollars a year. The Administration estimates that approximately $7 billion per year will be collected when the COET is in full effect. An exemption for small refiners could reduce this amount by more than 14 percent.

If there are 120 small refiners, the net tax savings per year exceed 6 million dollars per company due to the continuation of the bias alone. For a 70,000 b/d refiner the savings is more than 5.3 million dollars. That same refiner operating

at capacity with a projected average product price under S. 1472 of $.49 per gallon will have gross revenues of more than 525 million dollars. To argue that that is a small company deserving of additional tax breaks not granted its competition is to ignore the facts. (Similarly, a 30,000 b/d refiner will have gross sales exceeding 225 million dollars annually and would receive a tax break of 9.855 million dollars annually. That amounts to a guaranteed net profit of more than 1¢ per gallon if that refiner sells his refined product for cost before the tax credit is applied.).

4. THE IMPACT OF THE SMALL REFINER TAX RELIEF IS REGIONAL IN CHARACTER

Previous studies of the location of small refiners confirm the fact that a small refiner tends to be located near a domestic producing area rather than near metropolitan areas geographically remote from oil producing areas. For instance, PADD I (East Coast) has only one small refiner capable of producing a full range of petroleum products including motor gasoline. While PADD II (Midwest) has several refiners that would receive benefits, most of the market is supplied by the integrated companies and the larger "small" or "independent" refiners such as Clark and Ashland.

Most of the potentially benefitted refiners are located in California (Beacon, Mohawk, Powerine, Fletcher, San Joaquin, et al.), the Rocky Mountain area (Husky, Little America, Cenex, Thunderbird, C&H, et al), or the South and Southwest (Good Hope, Southland, Howell-Quintana, et al). A total analysis therefore indicates that approval of such an exemption from the crude oil equalization tax will only benefit an estimated maximum of 14 percent of the consumers of this country fortunate enough to live in proximity to a benefitted refiner. That is regionalism at its worst.

5. GOVERNMENT SUBSIDY THROUGH THE SMALL REFINER BIAS HAS BEEN ABUSED

The special incentives for small refiners have led to many abuses which have been previously documented. Processing agreements whereby one very small refined would have crude oil processed by a larger refiner to share small refiner bias advantages artificially diverted almost $20,000,000 per month from the entitlements program. Many, if not most, of the agreements had a refiner at 10,000 b/d or less on the receiving end of the benefits even though the almost $2.00 per barrel advantage was received from crude oil processed in a larger refinery. The benefits, however, promoted this type of free exchange of somebody else's money.

As soon as that loophole was corrected, refiners having exception relief entered into processing agreements to share the benefits of an FEA decision to maintain historic profitability. The result was that old domestic crude oil was diverted to one refiner having exception relief so that the refiner processing the crude would not have to buy entitlements for the crude oil.

Still another result of the Small Refiner Bias was the establishment of new, inefficient refineries at or under 30,000 b/d in order to receive the benefits of FEA entitlement programs. Some were new, some were reopened, and many were spinoffs from existing refining companies. None were of an optimum size to supply a full range of products to a market not adequately served, which can only confirm they were established to take advantage of crude cost advantages inherent in the entitlements program.

In 1976 and 1977, thirty-two refiners under 30,000 b/d either began, reopened, or will reopen operations. Of the thirty-two, twenty-one are under 10,000 b/d. It is highly unlikely that any of those small inefficient refiners would be attractive investments under normal economic conditions.

Also, in 1976 and 1977, at least four small refineries were sold by larger companies to so-called new entrants. Those sizes ranged from 2,500 b/d to 26,000 b/d. It is significant that at least one acquisition called for a sale of crude to and a buyback of products from the "new" entrant by the selling company.

Finally, as the Senate is aware, FEA can issue exceptions from purchasing entitlements to certain companies. One such company has increased its old oil receipts from approximately 125,000 barrels per month to over 750,000 barrels per month for the months of April, May, and June. Since that company does not have to purchase entitlements for its old oil, it has been able to absorb the benefits of more than $12,180,000 in three months. At its refinery capacity of slightly more than 3,200 b/d, that is an economic benefit of $41.83 per barrel

of capacity. Theoretically, if that same refiner entered into processing agreements with every refiner in the country for its old oil only, there would be no entitlements buyers for price controlled crude oil. (And no sellers, since there would be no one to sell to.)

Market penetration and limited plant expansion are also not only possible, but probable. Efficiency is not desired because profits and cash flow may be unwieldy. Instead, prices are maintained at the retail level with no benefit to the ultimate purchaser. The government subsidy is absorbed by the selling segment of the benefitted class of the industry. Refinery expensions in 1977 are listed at 17 projects of which 10 are by refiners under 30,000 b/d. None are listed for small and independent refiners over 70,000 b/d, and that is the size range that has supplied the competition historically in the motor gasoline market.

6. LEGISLATING A UNIFORM SCHEDULE OF EXEMPTION FROM THE COET DOES NOT RECOGNIZE THE DIFFERENCES THAT EXIST BETWEEN SMALL REFINERS

Substantial companies are included in the class that would receive benefits under an exemption from the COET. At least fourteen (14) of the benefitted firms are ranked in the Fortune 500. Several of the non-Fortune 500 companies are completely integrated companies owning or controlling a substantial amount of their own crude oil. Some companies are closely held and, therefore, publish no financial data. Many of the refiners that would be exempted benefit from captive markets in which limited product slates and refinery location provide a competitive advantage over even the largest competitor.

The questions of size and efficiency also must be considered. For instance, with the Small Refiner Bias in place, the impact on Clark compared to comparably sized competitors by refinery size is an follows:

		Approximately dollar per barrel benefits
Refiner A	(41,000 b/d)	0.445
Refiner B	(43,000 b/d)	.43
Refiner C	(50,000 b/d)	.35
Clark	(55,000 b/d)	(.059)
	(65,000 b/d)	
Refiner D	(49,000 b/d)	2.79
	(24,500 b/d)	

(Exception and appeal relief.)

Clark refineries are comparable to those refineries listed. All are major motor gasoline refiner-marketers. Clark competes with each of these refiners, and yet must make up about a 1¢ per gallon cost disadvantage against refiners in the same size range. The market is competitive and, therefore, Clark finds it impossible to recover its crude oil cost disadvantage in the market. Refiner D has FEA exception relief in addition to benefits from the Small Refiner Bias, but is listed to emphasize that all small refiners are not treated equally under existing programs, let alone proposed programs.

NOTE.—If existing entitlement parities are maintained in a Senate enacted amendment to the NEP, Refiner D could continue to receive the same benefits.

It must be emphasized that there are more than 120 small refiners. Some are crude oil producers. Some are divisions of multi-national conglomerates. Some are located in areas where competition is primarily major integrated companies. Some are located where there is no competition. Some compete in areas congested by other small refiners and must have special benefits to compete against each other. But, none of these refiners is completely identical. Yet, the proponents of an amendment promoting total or partial exemption from the COET would advise the Senate that some small refiners need a disproportionately greater benefit than other small refiners having the same sized refineries. Clark submits that such blanket arguments are without merit and defy logic.

SUMMARY

There is a strong movement by several very effective small refiner groups to convince the Senate that benefits in the form of an exemption from the COET are necessary to provide a basis for the continued existence and competitive viability of the small and independent refiners. If such a program were beneficial to all "small" and "independents," it would be supported by all small and

independent refiners. Yet, Clark can not find itself or other significant members of that class supporting the exemption. Nor is such an exemption supported by members of such industry groups as the National Oil Jobbers Council or the National Congress of Petroleum Retailers.

FEA is studying the impact of the Small Refiner Bias with a report due to Congress (in the House-passed H.R. 8444) within 90 days of passage. We urge the Senate to adopt that position. If it does not, the following is sure to result.

1. Continued unwarranted economic crude oil cost advantages will accrue to some refiners at the direct expense of less benefitted small and independent refiners such as Clark.

2. Continued artificial economic incentives will lead to further spinoffs by larger companies of their very small and less profitable refineries.

3. Larger refiners will be persuaded to enter into "strawman" processing agreements to take advantage of the exemption given to very small refineries.

4. While it is doubtful that the benefits of an exemption will be passed on to the consumer, most of the potential benefit will only accrue to the customers of the benefitted refiners leaving more than 80 percent of the American public, primarily in the East, Southeast, Northwest, and Midwest unaffected.

5. The benefits of the exemption will accrue to the benefit of many companies which have over one billion dollars in annual sales (one has over $4 billion).

6. The benefits will accrue to many smaller companies that have the benefits of being totally integrated, i.e., companies having the advantage of their own domestic crue production.

STATEMENT OF PETER G. KOLTNOW, PRESIDENT, HIGHWAY USERS FEDERATION

The Highway Users Federation is a non-profit business league with more than 500 corporate and industry members and 90 state and metropolitan area affiliated groups. More than 6,000 associations and other organizations across the country make up the affiliates.

Some of our members provide highway transportation goods and services All of us are consumers of these goods and services and, as such, we are dependent upon a continuing, adequate and reliable source of petroleum for motor vehicle fuel and related uses.

As highway users, we favor incentives that will encourage the exploration and development of additional petroleum supply, as well as incentives that will encourage needed conservation and more effective use of petroleum resources we now have.

We agree with President Carter that energy conservation goals are necessary, and that we should be paying the real replacement costs of energy. We further agree that motor vehicle travel will continue to grow. Sound national energy policy calls for a balanced effort toward conservation as well as increased development and production of domestic petroleum resources. The marketplace is the mechanism best able to further both goals.

Regarding energy issues of concern to highway users, we favor price deregulation of motor vehicle fuel, including gasoline, and commend the Federal Energy Administration for its position favoring deregulation. We agree with FEA in their stated conclusion in the Federal Register of August 12, 1977, that:

"Such an exemption from regulation will not result in inequitable prices for any class of user of motor gasoline fuel or other products."

We do not favor the crude oil equalization tax—the wellhead tax—which ultimately would raise the price of gasoline at the pump from five to seven cents per gallon without making any appreciable impact on conservation of motor fuel. As a practical matter, gasoline prices may vary substantially within a metropolitan area such as the nation's capitol, but there is little evidence that this price differential has had a major effect on where motorists buy their fuel.

The crude oil equalization tax does not provide needed capital for the energy industry to invest in domestic development and production of petroleum. Furthermore, there is reason to believe that it can create a geographical bias. Where distances are greater and no alternates to highway use exist, such as in the south and west of the nation, the wellhead tax, with its ultimate pass-through to gasoline prices, will strike hardest because it may unfairly penalize essential travel.

Western and southern states use significantly more gasoline per capita than northeastern states. For example, in the 11 northeastern states, annual per capita gasoline use is 375 gallons; in the 11 western states it is a third higher—almost 500 gallons.

In our judgment, the wellhead tax, sometimes referred to as the "centerpiece" of the Administration energy proposal, together with conservation of energy, similarly called the "cornerstone" of the National Energy Plan, create a curious and unstable structure upon which to build the nation's energy future.

Along the line of conservation, ride sharing is one of the most effective means of reducing rush hour energy consumption. Increasing commuter ride sharing by 20 percent would reduce gasoline consumption by as much as 250,000 barrels a day.

Toward this goal we recommend, as an incentive, an investment tax credit for employers against the capital costs of starting and operating vanpooling programs.

Employer-sponsored vanpooling has proven to be a cost-effective way of reducing rush hour automobile use. At the 3M Company—the pioneer in employer-sponsored vanpooling programs—more than a thousand employees now ride to work in 92 vans. Each van takes six or seven cars off the road. The company estimates that in 1976 vanpooling saved two million vehicle miles of travel and 165,000 gallons of gasoline.

Offering an investment tax credit would bring many more employers into vanpooling programs by allowing them to offset administrative costs and pass greater savings on to employee riders.

HIGHWAY USERS FEDERATION PER CAPITA GASOLINE CONSUMPTION (1975)

	Gasoline consumption [1]	Population (thousands) [2]	Per capita gasoline use	Rank
Alabama	1,861.9	3,614	515.2	15
Alaska	148.3	352	421.3	45
Arizona	1,128.2	2,224	507.3	22
Arkansas	1,142.1	2,116	539.7	10
California	9,985.7	21,133	472.5	36
Colorado	1,298.0	2,534	512.2	19
Connecticut	1,320.2	3,095	426.6	43
Delaware	292.6	579	505.4	24
District of Columbia	237.7	716	332.0	49
Florida	4,154.3	8,092	513.4	16
Georgia	2,722.1	4,926	552.6	6
Hawaii	276.3	865	319.4	50
Idaho	433.9	821	528.5	12
Illinois	4,759.4	11,160	426.5	44
Indiana	2,644.3	5,311	497.9	26
Iowa	1,460.1	2,870	508.7	21
Kansas	1,228.2	2,267	541.8	9
Kentucky	1,690.0	3,396	497.6	27
Louisiana	1,777.3	3,791	468.8	37
Maine	523.3	1,059	494.1	29
Maryland	1,811.8	4,098	442.1	41
Massachusetts	2,279.4	5,828	391.1	47
Michigan	4,386.1	9,117	481.1	32
Minnesota	1,868.1	3,925	475.9	34
Mississippi	1,148.9	2,346	489.7	31
Missouri	2,486.1	4,763	522.0	13
Montana	404.9	737	549.1	7
Nebraska	790.8	1,542	512.8	17
Nevada	393.9	592	665.4	2
New Hampshire	389.6	818	476.3	33
New Jersey	3,209.8	7,316	438.7	42
New Mexico	681.7	1,147	594.3	3
New York	5,457.8	18,120	301.2	51
North Carolina	2,748.1	5,451	504.1	25
North Dakota	324.6	637	509.6	20
Ohio	4,866.0	10,759	452.3	38
Oklahoma	1,579.2	2,712	582.3	5
Oregon	1,172.4	2,288	512.4	18
Pennsylvania	4,461.1	11,829	377.1	48
Rhode Island	369.8	927	398.9	46
South Carolina	1,471.7	2,818	518.7	14
South Dakota	375.0	683	549.0	8
Tennessee	2,221.3	4,188	530.4	11
Texas	7,260.9	12,236	593.4	4
Utah	610.8	1,206	506.5	23
Vermont	233.9	471	496.6	28
Virginia	2,450.4	4,966	493.4	30
Washington	1,657.1	3,544	472.7	35
West Virginia	805.2	1,803	446.6	40
Wisconsin	2,065.3	4,606	448.4	39
Wyoming	280.0	374	748.7	1
Total, United States	99,353.6	213,540	465.3	

[1] Highway use, in millions of gallons. From FHWA table MF-26, December 1976.
[2] Provisional estimates as of July 1, 1975. From U.S. Bureau of the Census.

STATEMENT OF THE NATIONAL PETROLEUM REFINERS ASSOCIATION

The National Petroleum Refiners Association is vitally interested in the self-sufficiency of energy supplies in the United States. Our membership comprises virtually all of the U.S. petroleum refiners and most of the companies manufacturing petrochemicals.

The NPRA supports the broad objectives of the Administration's National Energy Plan which fosters the conservation of oil and natural gas and encourages the development and utilization of alternative domestic energy resources. However, the Administration's Plan contains assumptions and provisions which generate substantial questions as to the feasibility of meeting the stated objectives. The Plan envisions early availability of an adequate supply of alternative energy sources, primarily coal. According to the Congressional Research Service of the Library of Congress, the General Accounting Office and the Office of Technology Assessment, the development and utilization of our nation's coal reserves to the extent visualized in the National Energy Plan for 1985 appears highly unlikely due to inadequate coal production capability and lack of transportation facilities, as well as technological and environmental constraints. Additionally, the means proposed in the National Energy Plan for achieving these objectives—the imposition of the Crude Oil Equalization Tax and the oil and natural gas consumption taxes—will not provide effective incentives for the replacement of oil and natural gas with other energy sources.

We unequivocably believe that the interaction of economic incentives in the marketplace is the best means of encouraging the efficient use of energy resources. The imposition of the Crude Oil Equalization Tax and the oil and natural gas consumption taxes does not provide refiners and petrochemical manufacturers with adequate investment capital to increase manufacturing capacity and thereby decrease dependence on foreign energy supply. The effect of these taxes will be to raise the cost of domestic refined petroleum and petrochemical products above world parity, thus rendering them non-competitive in the world market. The resultant increase in product imports will not only lead to increased reliance on foreign energy sources, but will also endanger jobs in the domestic refining and petrochemical industry. In addition, the increase in the cost of domestic products will ultimately be borne by the consumer.

Economic incentives for conservation and conversion of fuels are only effective when cost is the primary consideration in their selection. Technological, environmental and safety considerations may well act as overriding factors in these selections. When it is not technologically feasible to convert to alternative fuels, no amount of economic incentive will bring about this conversion. Where the potential for conversion exists, we believe that the natural interplay of economic forces would produce stronger and more permanent incentives than would the imposition of an artificial structure of taxes, rebates and investment credits.

The House of Representatives has recognized the need for improvement of the Administration's proposals and has eliminated the excise tax on feedstocks and nonconvertible process uses of oil and natural gas. These taxes would have been inflationary and would not have made any contribution to conversion or conservation of energy resources. Excise taxes have also been dropped for stand-by uses of oil and gas (e.g. emergency fire protection, start-up, etc.). Language has also been written into the Act to exempt non-marketable by-products from excise taxes. We support these modifications.

Remaining taxes on industrial and utility boiler fuel and conservable process uses will increase costs, due to oil use, above world levels and make U.S. industries non-competitive. This would have a serious effect on the U.S. economy. We believe that all taxes which place goods at a cost disadvantage on the world market should be eliminated and the exemptions already provided for by the House of Representatives should be maintained by the Senate.

Conservation of oil and natural gas resources and increased utilization of alternative fuels are important priorities in any national energy policy. Where conversion of alternative fuels is feasible, economic incentives based on free market pricing are appropriate to promote this conversion, rather than oil and natural gas taxes. In situations where conversion to alternative fuels is not feasible, and fuel conservation is currently being practiced, oil and natural gas consumption taxes are punitive in nature. They also increase inflationary pressures and have a serious effect on employment through reduction in our balance of trade.

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STATEMENT OF MICHAEL GROGAN, LAKE PARK, FLA.

AN ALTERNATIVE TO GROWTH

The problem

"If California ever becomes a prosperous country, this bay (San Francisco) will be the center of its prosperity," wrote Richard Dana in 1835.[1] On the other side of the continent, in Florida, there were only a few wigwams and a couple of lighthouses. And Cutty Sark was "down South in the big winds going like smoke"[2] across the lonely Southern Ocean to pick up a few bales of wool from small convict settlements in Australia.

In only 150 years since the Industrial Revolution, there have appeared in the above areas such huge cities as Los Angeles, San Francisco, Miami, Tampa, Sydney, Adelaide and Melbourne. And growth in other areas of the world has been just as fantastic. Clearly such rapid growth over the next 150 years will be impossible. If each of the four billion people alive in the world today had as much material wealth as the average middle class American, then the only thing that would save the human race from choking on its own pollution would be that we might have run out of workable nonfuel minerals and existing energy resources.

With big reservations, the National Commission on Supplies and Shortages[3] says of nonfuel minerals that we are alright for the next 25 years and "probably for generations thereafter." That is as they are presently distributed. As regards energy, the Commission warns, "If population growth is not checked and if our energy supplies are not made more adequate and secure, serious problems will eventually result." Eventually? Have they not already resulted?

What are world leaders doing about all this? They are calling for 5 percent growth in their Gross National Products. At only simple interest 5 percent over 20 years becomes 100 percent. The GNP is only a figure; but what is only a figure in statistics is, in real life, Los Angeles and all the other cities, towns and villages, the roads that connect them, and the cars and trucks on those roads. This is what we cheerfully plan to double in the next twenty years.

We are told we must have growth to solve unemployment. But we are not told that doubling an economy in twenty years also means doubling most problems in that time.

All the 150-odd nations of the world are striving for this same goal of growth; a goal which, as it always has throughout history, must bring them into conflict with each other. What can one say of nations that strive to double their need for resources over twenty years when there is no certainty of resources beyond twenty-five years, even to sustain us without growth?

Some have begun to talk of "balanced growth." Presumably this means growth to solve unemployment "balanced" with concern for the environment. But "balanced growth" is a dangerous, misleading catch-phrase, implying that some growth is desirable. Some growth is inevitable while we change gears, but the only growth that is desirable is the economic growth of poor peoples. Economic growth in the already overgrown industrial nations, and population growth in all nations has to be slowed, halted, and then reversed. If we do not do this ourselves rationally, it will be done for us violently.

The solution

If the industrial nations are to halt growth the only way to solve the problem of unemployment is to redistribute wealth. This can be done by placing lower and upper limits on wealth in the following manner.

A lower limit on wealth (or minimum income) should apply, not to all, but only to those over the age of 55 or 60—and to anyone physically unable to work. This would encourage earlier retirement and solve unemployment without growth. Earlier retirement is better for this purpose than a shorter work week because work would remain a necessity for survival. Welfare and unemployment benefits would have to be transferred to the Social Security Fund to pay for earlier retirement; those below the retirement age (which should be adjustable) would no longer have welfare support. And wages, being necessary for survival, would be

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[1] Richard Henry Dana, Jr. "Two Years Before the Mast." New York: Doubleday & Co.

[2] Sir Francis Chichester. "'Gipsy Moth' Circles the World." London: Hodder & Stoughton Ltd. 1967.

[3] "Government and the Nation's Resources." Report of the National Commission on Supplies and Shortages. U.S. Government Printing Office. December 1976.

market-controlled. Earlier retirement could be further financed by encouraging savings, private pension funds and retirement accounts for those of low income. This would also encourage the non-wealthy to build up investment capital.

An upper limit on wealth should initially apply only to the super-rich (say those with property above $20,000,000) so as not to cause disruption to the economy, and as a pilot scheme from which to learn. Later the limit could be reduced to say $250,000 a year as income until perhaps $5,000,000 in property is reached, at which point both income and capital gain would cease entirely. The very rich would have to live off capital. In time people would learn to limit property so as to maintain income for living expenses. Thus an upper limit would compel the redistribution of wealth.

What would happen to the $250,000 that capital of $5,000,000 generates at 5 percent?

Presently earnings (interest, dividends, rent, etc.) from excessive[4] capital continue to multiply excessive capital only because the very wealthy say this should be so. As John Stuart Mill put it, "The distribution of wealth depends on the laws and customs of society. The rules by which it is determined are what the ruling portion of the community make them, and are very different in different ages and countries . . . Even what a person has produced by his individual toil, unaided by anyone, he cannot keep, unless by the permission of society. Not only can society take it from him, but individuals could or would take it from him if society . . . did not . . . employ and pay people for the purpose of preventing him from being distributed in his possession."[5]

Even with the advent of democratic principles "the laws and customs of society" are still made by, and for the benefit of, the wealthy. So that today we have progressive tax rates that are negated by loopholes which apply to income from property and never to income from toil.

So equity and reason would justify the re-allocation by society of earnings on capital above a certain amount in any of several ways: (1) The building up of Social Security funds; (2) as investment capital by corporations (the upper limit would not apply to corporations, only to individuals) relieved of paying dividends to those who already have more than enough dividends; (3) as wage increments for those at the lower end of the scale; or (4) as a means of reducing the cost of goods and services.

So as to invalidate talk of "confiscatory taxes" the upper limit could be enforced by law rather than by 100 percent taxes. And to the same end, those who already exceed the upper limit at the time of introduction could be allowed to die off, but not to leave their estate to anyone whom it would put over the upper limit.

The upper limit should also be adjustable by Congress.

The objections

Amongst those with whom the foregoing ideas have been discussed there has been 1) ready acceptance by many, (2) bewildered silence from some, and (3) angry hostility from a very few. Groups 2) and 3) may consist mostly of those oblivious of The Problem, and therefore seeing no need for The Solution. So here, very briefly, are the main objections that have been advanced along with their rebuttals.

(1) "How do you answer people who say, 'Is not the plan a step in the direction of communism?' The rebuttal is simple and obvious. Under communism the state owns all property in the name of the people. Under this equity plan, property would be owned by ALL the people in their own name. As then-Treasury Secretary William Simon, who read this plan,[6] told the House Ways and Means Committee, "In this great country of ours everyone can be a capitalist."[7] Later he proposed a "radical tax simplification to achieve basic equity,"[8] on which the Treasury Department has since been working.

(2) "Would not an upper limit on wealth destroy incentives?" Here again the rebuttal is simple and obvious. It would transfer investment and incentives from those who do not need them to those who do. There are also those who say that high salary incentives are necessary to attract the best men. (It could

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[4] The accent is on excessive capital ownership. Earnings from reasonable capital ownership are highly desirable for an industrious and thrifty populace.
[5] John Stuart Mill. "Principles of Political Economy." 1848.
[6] Private Correspondence with the author.
[7] "Congressional Record—House." August 1, 1975.
[8] "The National Observer." January 17, 1976.

be argued that they attract the most avaricious men with the least concern for the future of anyone but themselves). Few salaries would be affected by the plan, which would apply mostly to income from property, which is the source of all super-income income. And, those corporate executives who receive several times the salary of the President of the United States always have the "reverse incentive" that, if they do not deliver, they can be dismissed.

Investment incentives are inseparably bound up with growth. If we recover from the growth compulsion, neither incentives nor investment will be so important. If we do not recover from it, we shall end, not with prosperity, but in bankruptcy.

(3) Another objection voiced is that the super-rich contribute to hospitals, universities, etc. But extremes of wealth and poverty can in no way be put right by charity. Hospitals are not, and never should be, dependent on charity; and universities, in their quest for knowledge and truth, should not be indebted to special groups, nor any particular class.

(4) To those who say there would be a flight of capital from the country, the counter argument is that the country could not be bought up by foreigners. Also, the upper limit would limit what could be taken out of the country.

(5) The objection that the lower limit would be too expensive is met by the fact that it would depend on what the nation could afford. A lower limit only starting at age 55 or 60 would be much less expensive than a welfare-state guaranteed annual income for all.

Amongst the many advantages of the plan there is space here to mention only two. First, when the wealth that can be piled on top of wealth as a result of property ownership is reasonably limited, then the vast majority who are dependent on toil for their livelihood will be less disgruntled and less insistent on inflationary—but necessary—wage demands.

Second, halting growth does not mean halting progress. On the contrary, halting growth should eventually mean less spending on the arms race necessary to ensure supplies from overseas, thus freeing armament funds for more constructive programs.

The summation

Clearly, talk of closing tax loop-holes and redistributing wealth is self-contradictory if in the same breath we insist on maintaining incentives for the very rich.

Equally clearly, talk of conservation in the same breath as expansion, recovery or growth is self-contradictory.

None of our problems would be so ominous if San Francisco (and all other cities) were today in size somewhere between what Richard Dana found in 1835 and what spawned the Simbionese Liberation Army in 1970. And we may again need a Cutty Sark for "7,000 miles of running down her easting on the clipper way, one of the greatest sails in the world, 7,000 miles in a straight line (rhomb line)"* from the South Atlantic to Bass Strait. Seven thousand miles of plentiful, clean inexpensive and hard-to-harness energy.

In 1835 the troubles that lay ahead included two world wars waged with Industrial Revolution weapons, and dwarfed those that lay behind. In 1977 ever-increasing populations, dominated by men of guile but not of wisdom, armed with ever more devastating weapons, compete for ever-diminishing resources. So the troubles that lie ahead must surely dwarf the two world wars that lie behind unless—

Unless we learn the oil lesson that there may still be time to use reason more, and muscle and propaganda less.

INSULATED CABLE CORP.,
Oakland, Calif., August 12, 1977.

Senator RUSSELL B. LONG,
Chairman, Senate Finance Committee, Washington, D.C.

DEAR SENATOR LONG: After reading the enclosed material I am sure you will understand why I ask that the following points be read into the Committee's Record of hearing on tax incentives for the utility industry and that every effort be made to have other appropriate Senate Committees take similar action:

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* Sir Francis Chichester. Ibid.

All Federal contracts calling for electrical power, distribution, and transmission cables should be written to allow alternative bids for energy conservation.

All such bids should be assessed on a life/cycle cost basis as well as initial costs.

As much as possible, private industry should be encouraged to do the same.

The advantages for our Country would be in:

Reduced possibilities for "blackouts".

Lowered energy costs because of lower life/cycle costs.

Energy conservation because of reduced line losses.

There are alternatives available to the utilities if they are encouraged to use them. I think these measures would help.

Keep up the good work on the Finance Committee.

GORDON WINCHESTER.

[From the Chicago Tribune, Thursday, Aug. 11, 1977]

PG&E WARNS OF OVERLOAD BLACKOUTS—COST OF BLOCKING BLACKOUT

WASHINGTON (AP).—Consumers may have to pay higher electric bills to prevent power blackouts like the one that darkened New York City for 25 hours last month, a congressional hearing was told yesterday.

An official of New York City's electric utility also believes electric companies in other cities are vulnerable to massive power failures.

Carroll H. Dunn, senior vice president of Consolidated Edison Company, told the Joint Committee on Defense Production that redundant facilities "costing in the millions" are needed to prevent power blackouts. The costs of the extra facilities probably would be passed along to consumers he testified.

Sen. William Proxmire, D-Wis., said, "It's becoming obvious that we have to do more to protect this industry from natural disasters and sabotage. But when we do so, it is going to cost the consumer more when he pays his electric bills. We have to try to balance the two factors."

Dunn said extra transmission lines cost about $15 million per mile. "We have about 50 miles, but to be fully effective they would have to connect to feeder lines that come from long distances outside our service area," he said. "It would take many millions of dollars and this probably would have to be passed on to the consumer," he said.

However, he added that New York is particularly vulnerable because most of its power is brought into the city from one direction. "We have to have redundancy in certain key areas and we are working on it," he said.

Dunn said the only alternative to higher consumer bills would be federal funding, but Proxmire said Congress is unlikely to take this route.

The July blackout has been blamed on bolts of lightning during a storm, but the Federal Power Commission has said Consolidated Edison's facilities were inadequate.

Dunn said the Con Ed system "has met all FPC and other regulatory agency criteria for such a system."

Asked by Proxmire if a paralysis similar to that suffered by New York could happen in cities like Chicago, Los Angeles and Boston, Dunn replied, "In my opinion, it could."

Detailing Con Ed's plans to improve the reliability of its system, Dunn predicted that other electric utilities would look into similar measures.

Proxmire and Dunn agreed that consumers could not afford to pay for a totally foolproof system. "Increasing reliability beyond a certain point becomes increasingly more expensive for each increment gained," the Con Ed official said.

Dunn said power failures also could be caused by terrorists using well placed bombs. "If they were able to get access to the right places and were able to set them off almost at the same time, they could do it," he testified.

Dunn said bombs have disrupted several West Coast power systems but that his company had not experienced such sabotage.

All three million electricity customers of the Pacific Gas and Electric Co. are being notified that they are in "blocks" of circuits that may be turned off in the event of critical overloading of the system.

Electrical customers across the 94,000 square miles of the PG&E service area in Northern and Central California have been divided into 20 blocks, according to a spokesman for the utility.

An insert with each customer's bill is being distributed to notify each of the number of the block.

Assignment of the block number is done according to the circuits to which each customer is connected and does not follow any regular geographic features, since circuits are intertwined and skip around without discernible pattern.

Should an emergency require it, each block could be deprived of electric power in a "mandatory service interruption" designed to maintain service to the remaining blocks.

PG&E would attempt to rotate blocks turned off to insure equitable sharing between all its customers, the spokesman explained.

"No one would be exempt," said the spokesman. "Street lights, traffic lights, hospital electrical systems and home power would be turned off on the circuits identified by the block number."

Should the demand for electricity come close to the capacity of the system, PG&E would notify the public, warn of the possibility of mandatory service inetrruptions and ask for a cutback in the use of power, the spokesman said.

Before blacking out any block, PG&E would attempt to notify customers in advance through the news media, the spokesman said.

"We are cautiously optimistic that we have passed the peak of demand during the hottest of summer weather, and are hopeful of making it through this summer without the need for rotating outages," the PG&E spokesman said. "The critical periods may come in the summers of 1978 through 1980, by which time we hope to have developed more generating capacity."

STATEMENT OF THE GAS TURBINE DIVISION, GENERAL ELECTRIC COMPANY

This statement is submitted by the Gas Turbine Division of the General Electric Company to express our concerns relative to certain tax provisions associated with the National Energy bill now being considered by your Committee.

Simple cycle combustion gas turbines are operated for short periods of time (less than 1500 hours annually) to provide utilities with economic electric power to meet peak load requirements. Combined combustion gas and steam turbine plants are more efficient and, consequently, are utilized, for the most part, in intermediate electric generation service (up to 4000 hours per year). The combustion gas turbines in both types of generation can presently burn many forms of oil and natural gas but, as yet, do not have the capability to burn coal. They are capable, however, of later conversion to coal-derived fuels when these fuels become commercially available. Presently such plants comprise 9 percent of the Nation's electrical capacity while consuming less than 1 percent of the total national oil usage.

Both the Senate and House Bills on coal conversion (S. 977 and HR 8444, Part 6) recognize that peaking power plants are essential and that they are required to burn oil. Consequently, both bills do provide for appropriate exemptions. The Senate Bill also recognizes the need for and provides exemptions for intermediate load plants. The House Bill does not specifically identify intermediate load plants but such plants were the subject of a colloquy favoring their continued development during committee mark-up and there are general exemptions that would allow such plants to burn oil. Certain exemptions are mandated (as in the case of peaking combustion turbines where there is no practical alternative to supplying this portion of the daily load cycle); others are left to the discretion of the Administrator in cases where the use of coal is precluded by environmental regulations, or where the granting of an exemption serves the overall purposes of the legislation.

In summary, therefore, we feel the regulatory legislation contained in both bills does recognize the need for exemptions to allow oil burning, but, we are quite concerned with the tax provisions proposed by the House Bill HR 8444. Our concern centers on the fact that under Title II of this bill a utility which has been granted a regulatory exemption under Title I will be denied the use of the standard business tax incentives such as investment tax credit, accelerated depreciation and the asset depreciation range. Further, a fuel use tax is to be imposed on usage of oil or gas. The result of this legislation will mean an increase in cost of generating electricity of between 10 percent and 15 percent per kilowatt hour for peaking and intermediate load generation using combustion gas turbines.

In our opinion it appears inconsistent to recognize that a usage is essential

on one hand and then penalize such use by imposition of tax penalties, especially when it has been judged that there is no practical alternative way to meet these special power generation needs.

For these reasons we respectfully request that your Committee support the position that would provide an exemption from a fuel use tax and would allow standard business tax incentives for those power generating facilities that are granted regulatory exemptions under Senate Bill 977.

STATEMENT BY E. I. DU PONT DE NEMOURS AND COMPANY

The Federal Energy Administration has classified the chemical industry as the most energy-intensive of all industries. Our oil and natural gas use is nearly equally divided among feed-stock, process and boiler fuel uses. Du Pont depends upon hydrocarbons as raw materials for over 80 percent of our 1700 product lines. These feedstocks are used to produce fibers for apparel and furnishings, plastics for homes, transportation and electrical equipment, films for packaging, medical and electrical uses, pharmaceuticals, and agricultural chemicals. Last year Du Pont paid over $1.7 billion for fuels, energy and chemical intermediates derived from oil and natural gas. As a large energy consumer, Du Pont would be directly and significantly affected by the proposed National Energy Act.

The Administration's effort to formulate comprehensive legislation has provided a needed focus on the energy problem as well as the leadership to mobilize efforts toward its solution. We are, however, concerned that the potential economic consequences of the National Energy Act have not been fully evaluated. The Administration's proposal does not provide sufficient incentives for exploration and development of untapped domestic supplies of oil and natural gas. The tax proposals would not successfully accomplish the conservation and conversion goals for which they were designed. These taxes, would, however, have the undesirable effect of increasing domestic inflation ad worsening our balance of trade deficit.

We offer the following general recommendations regarding the issues before your Committee:

(1) Because of their impact on international competitiveness, their complexity and the fact that they are unnecessary and will not materially promote further conservation or conversion to alternate fuels, the taxes on business use of oil and natural gas should not be enacted.

(2) Any excise tax which is enacted should be limited to those facilities which can be economically and technically converted to use of alternate fuels.

(3) If existing boiler uses are to be taxed, substantially greater incentives are necessary to cause replacement of existing oil or gas fired boilers.

(4) Phased deregulation of oil and natural gas is a preferred method to bring oil and gas prices to replacement levels as compared with an equalization tax.

(5) If an equalization tax is enacted, receipts therefrom should be directed toward energy purposes, including increased incentives for domestic oil and natural gas production.

(6) Feedstock and process fuel uses of natural gas liquids should not be taxed to raise prices above their world market levels, although boiler uses thereof should be discouraged.

The following provides a further explanation and support for the foregoing:

Excise tax on business use of oil and natural gas

We believe the proposed business use tax is unnecessary to promote conservation, and would be ineffectual in promoting fuel conversions from oil and gas to coal. This tax as proposed is very complex and would favor certain regions of the country over others. The result of such a tax would significantly increase inflation and have a severe, adverse effect upon our foreign balance of trade. As an alternative, we favor the mandatory coal utilization approach currently embodied in S. 977. This legislation accomplishes the transition from gas and oil to coal as a primary energy source where feasible without many of the adverse economic impacts of the user tax.

Both incentives and responsive action to conserve already exist. Energy costs to U.S. industrial consumers have increased markedly over the last four years. For example, the Du Pont Company's Purchase Cost Index for energy has increased 2.8 times over the same period. These cost increases, and the likelihood of

even higher future energy costs, have provided more than enough incentive for industry to conserve energy wherever possible. Already the chemical companies reporting under the voluntary energy conservation program through the Manufacturing Chemists Association show a 10% reduction in fuel and power consumption per unit of output compared to 1972 figures. For the 12-month period ending June 1977, the Du Pont Company reduced its per unit of output energy consumption by 13.1% over the 1972 base. If energy costs reach their free market levels, the incentives for conservation will be increased further.

However, there are some important considerations to bear in mind in dealing with industrial conservation of oil and natural gas. First, changes in facilities to reduce use of oil and gas frequently require large capital investments. For example, in the case of existing boilers, replacement of oil and gas boilers with coal fired facilities would require substantially greater incentives than those under current legislation in order to be economically attractive. Second, existing U.S. industry has a large energy base load demand below which conservation efforts become counterproductive. Finally, energy efficiency is generally maximized when plants are operated near their design capacity. A decrease in output will also result in a decrease in efficiency of energy use.

Oil and natural gas provide chemical raw materials for a myriad of products (see Exhibit 1). However, the direct use of coal as a chemical feedstock is not yet technologically and economically feasible. The same is true for almost all process fuel requirements for oil and natural gas. While federal assistance in research and development, particularly for first-of-its-kind demonstration plants, is desirable, technology for greater utilization of coal as a source of feedstock and process fuel is not now economical. For some time to come, we must rely on petroleum and natural gas to supply these high priority uses. Taxing these nonsubstitutable uses can serve no valid purpose.

Use of coal in boilers

Coal can most readily be used for fuel in large steam generating boilers. Where coal firing capabilities presently exist, reconversion to coal is becoming increasingly more attractive. For example, since the oil embargo, the unavailability of gas and the price of oil have prompted Du Pont to make plans for the installation of particulate control equipment at a number of its plants which had previously burned coal as a boiler fuel. As a result, Du Pont's coal usage for fuel purposes has increased nearly 25 percent since 1973 and now accounts for over one-third of our total boiler fuel use.

However, the capital investment required to build coal fired boiler facilities is very high. For an industrial boiler of 250,000 pounds of steam per hour, it often costs two to three times as much in initial capital investment to put in a coal as opposed to an oil fired facility. Although for new boilers coal firing is now becoming preferred based on forecast energy costs, the same is not true regarding replacement of existing boilers.

Replacement of existing oil and gas fired facilities with coal is not a simple matter of retrofitting existing facilities. The boiler itself must be much larger, and is different in design (see Exhibit 2). In addition, a series of auxiliaries including the coal bunker, the ash hoppers and dust collectors must be located adjacent to the boiler. Further, coal transport, storage, preparation and delivery equipment are required. An ash disposal system, not present with oil or gas boilers, is also necessary.

While it may appear theoretically possible to utilize some existing auxiliary facilities, as a practical matter this is rarely possible. For efficiency, most steam using processes are built surrounding the boiler house. Due to the tremendously different space requirements, coal burning equipment would normally have to be located remotely from the existing boiler. In order to dismantle, relocate and reassemble such existing auxiliary equipment, plant operations would have to be shut down for an unacceptable period of time.

It becomes clear then, that conversion to coal of existing facilities becomes a matter of complete replacement of existing oil and gas fired facilities. In many circumstances, due either to physical space limitations or environmental restrictions, conversion to coal is impossible. Where it is possible, replacement of existing facilities would require significant capital expenditures.

The ability to avoid use tax liability by prompt installation of "qualifying energy investment" has in our view been overestimated. The use tax rebates would not include demolition costs, land costs, water treatment costs, building

costs, control instrumentation, piping, insulation, and ash handling and disposal facilities. The definition of "qualifying energy investment" subject to credit against the use tax might represent only 50 to 60 percent of the battery-limits cost to replace an existing oil or gas fired facility with a coal fired unit.

Additionally, the replacement of existing oil or gas fired equipment, which may have many years of useful life left, with coal fired units represents a nonproductive investment. The monies to finance these large expenditures must come from someplace—principally operative earnings. For every dollar spent in such nonproductive investment, a corporation potentially loses fifty cents in after tax earnings. Because this investment would be competing with other projects for scarce capital funds, it is highly unlikely that the business use tax, even with the credits, will promote more conversion to coal than is already underway or planned.

In view of the foregoing, we support the approach in S. 977 of directing efforts toward facilities where use of alernate fuels is both technically and economically feasible. If a user tax is enacted, it should be limited to those cases where that criterion is met, for example, large new boilers. Feedstock and process fuel uses should not be taxed.

Administrative complexity of users' tax

Because Btu content varies with the many blends of oil and gas products, the proposed use tax would be a very complex administrative burden. Determining what constitutes an "exempt process use" would be an especially difficult problem since there are thousands of separate process fuel uses in the chemical industry where direct coal-firing as a heat source is not feasible. Applying the proposed use taxes to such process uses would only encourage exemption applications and further overburden the Treasury Department. The use tax, if enacted, should apply only to boiler fuel uses of oil and natural gas.

Impact of user tax on the balance of trade

The business use tax which is proposed by the Administration would raise domestic energy prices above world market levels. Domestic industries, such as the chemical industry, would be seriously disadvantaged in world trading if this tax were enacted. For example, petrochemical exports in 1976 were slightly over $6.0 billion, with imports of $1.9 billion, for a positive balance of $4.1 billion. The chemical industry as a whole contributed a favorable trade balance of over $5.0 billion for 1976. The use tax, by its effect upon the chemical industry, will cause our balance of trade deficit to worsen.

In raising domestic energy costs above world levels, the use tax acts to improve profit margins for foreign competitors and makes the importation of energy-intensive products more attractive. Since the value of these petro-based manufactured products is much higher than crude oil, the impact on our balance of trade deficit of importing these products will be more severe than if crude itself were imported for refining here.

In considering the impact on competitiveness, several factors are noted: First, there is already vigorous competition with foreign countries. In the chemical industry, seven of the top ten companies are foreign. Second, many foreign countries offer tax, capital formation and other incentives which compensate for our existing energy price advantage. Third, since oil prices have been dollar based, dollar devaluation has decreased oil prices for some of our most important competitors. Finally, the oil equalization tax alone would add more than 20 percent to energy prices.

We believe that the use tax on oil and natural gas is unnecessary to promote conservation. In addition, it will not significantly increase coal utilization. It will, in our opinion, have a greater detrimental effect on inflation than a positive effect on our energy balance. Therefore, a business use tax should not be enacted.

The crude oil equalization tax

Past history has demonstrated that energy price controls have worsened our energy problems. The federal government has since 1954 maintained price controls on natural gas sold in interstate commerce. Since 1973, the federal government has controlled the price of domestic crude oil. In both cases, the disparity between controlled and free market prices for energy resources has steadily widened. Because oil and gas prices have been held artificially low, demand for these energy resources has increased while domestic supplies have dwindled. As a result of these administrative restrictions on the free marketplace and increas-

ing environmental constraints, the demand for coal has been simultaneously depressed.

The Administration's proposed crude oil equalization tax would continue price controls and would raise the consumer's cost of oil but would not help provide the large amounts of capital which will be necessary to further develop existing domestic resources. The revenue generating aspect of this proposal would also tend to entrench and extend federal price controls. Moreover, administration of a crude oil equalization tax would necessarily be very complex. The Btu and sulfur content affect the value of each barrel of oil, and would have to be taken into account by the tax. Difficulties similar to those encountered under petroleum allocation and pricing regulations are inherent in this proposal.

To better achieve the Administration's objectives, the Du Pont Company advocates a gradual lifting of federal energy price controls. We believe the free marketplace is the best allocator of energy resources. Governmental controls have proven too inflexible to effectively adjust to changing market conditions. We do not support immediate, total deregulation. Due to past federal controls, complete, precipitous deregulation would be too disruptive. Phased deregulation by lifting federal price controls only on newly discovered oil and natural gas supplies is therefore urged. Such limited decontrol would serve to encourage needed domestic exploration, and would not reward producers for developing previously discovered but untapped reservoirs. Impact upon consumers would be limited since the effect of higher prices for newly discovered reserves would be tempered by the continued lower, controlled prices of previously existing reserves.

Such a proposal would stimulate supply while having the least impact upon consumers. Consumer recognition of energy resources being released from controlled, artificially low prices will provide the desired signal to conserve. As existing reserves are gradually depleted, federal controls would, in effect, gradually be replaced by the mechanisms of an uncontrolled marketplace.

Equalization tax on natural gas liquids

The proposed National Energy Act, under the equalization tax sections, also imposes a tax on the sale or use of controlled natural gas liquids (NGL's). While certain sales and uses are exempted from the tax, there is no exemption for petrochemical feedstock and chemical process uses. In addition, the user taxes will make controlled NGL's a cheaper boiler fuel than No. 2 distillate oil, thereby diverting these valuable products to inferior uses. We therefore urge that feedstock and process uses of NGL's be exempted from the equalization taxes, and that if the user taxes are enacted that NGL's be treated as "oil" for purposes of said taxes.

Production incentives

Irrespective of the method for raising energy prices to replacement costs, incentives should be provided to direct the added capital to energy purposes. Thus, if equalization taxes are enacted, receipts therefrom should be used to encourage exploration and development of existing reserves, mass transportation, coal utilization, development of alternative energy supplies, funding of the Strategic Petroleum Reserve and other energy-related projects.

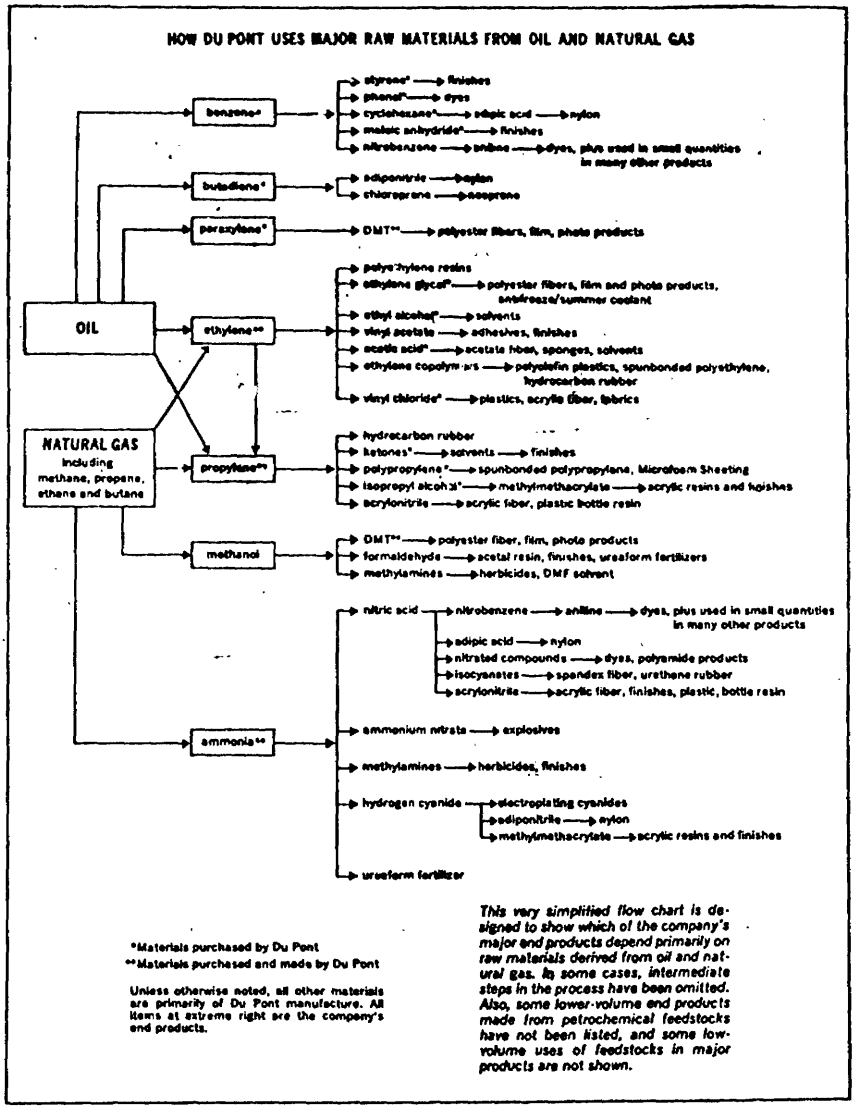
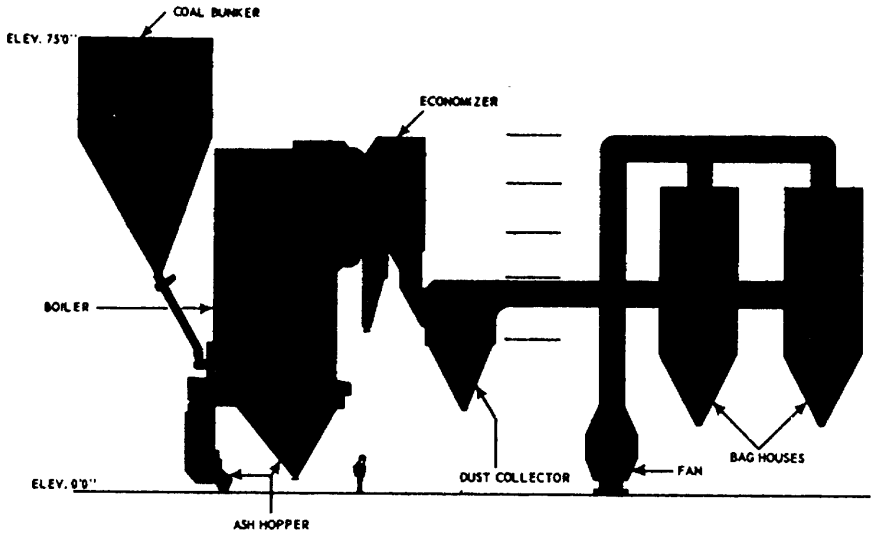
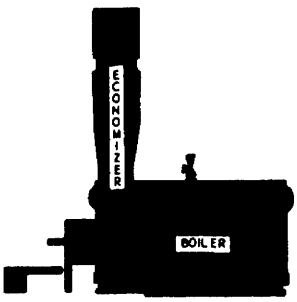

HOW DU PONT USES MAJOR RAW MATERIALS FROM OIL AND NATURAL GAS
OIL
NATURAL GAS
including methane, propane, ethane and butane
benzene*
styrene* → finishes
phenol* → dyes
cyclohexane* → adipic acid → nylon
maleic anhydride* → finishes
nitrobenzene → aniline → dyes, plus used in small quantities in many other products
butadiene*
adiponitrile → nylon
chloroprene → neoprene
paraxylene*
DMT** → polyester fibers, film, photo products
ethylene**
polyethylene resins
ethylene glycol* → polyester fibers, film and photo products, antifreeze/summer coolant
ethyl alcohol* → solvents
vinyl acetate → adhesives, finishes
acetic acid* → acetate fiber, sponges, solvents
ethylene copolymers → polyolefin plastics, spunbonded polyethylene, hydrocarbon rubber
vinyl chloride* → plastics, acrylic fiber, fabrics
propylene**
hydrocarbon rubber
ketones* → solvents → finishes
polypropylene* → spunbonded polypropylene, Microfoam Sheeting
isopropyl alcohol* → methylmethacrylate → acrylic resins and finishes
acrylonitrile → acrylic fiber, plastic bottle resin
methanol
DMT** → polyester fiber, film, photo products
formaldehyde → acetal resin, finishes, ureaform fertilizers
methylamines → herbicides, DMF solvent
ammonia**
nitric acid → nitrobenzene → aniline → dyes, plus used in small quantities in many other products
adipic acid → nylon
nitrated compounds → dyes, polyamide products
isocyanates → spandex fiber, urethane rubber
acrylonitrile → acrylic fiber, finishes, plastic, bottle resin
ammonium nitrate → explosives
methylamines → herbicides, finishes
hydrogen cyanide → electroplating cyanides
adiponitrile → nylon
methylmethacrylate → acrylic resins and finishes
ureaform fertilizer
*Materials purchased by Du Pont
**Materials purchased and made by Du Pont
Unless otherwise noted, all other materials are primarily of Du Pont manufacture. All items at extreme right are the company's end products.
This very simplified flow chart is designed to show which of the company's major end products depend primarily on raw materials derived from oil and natural gas. In some cases, intermediate steps in the process have been omitted. Also, some lower-volume end products made from petrochemical feedstocks have not been listed, and some low-volume uses of feedstocks in major products are not shown.

EXHIBIT 1



COAL BOILER - 150,000 LB/HR STEAM CAPACITY



OIL BOILER - 150,000 LB/HR STEAM CAPACITY

EXHIBIT 2

STATEMENT BY CELANESE CORPORATION PREPARED BY DANIEL F. TWOMEY

Mr. Chairman, members of the committee, my name is Daniel F. Twomey. I am Director of Traffic, Chemical Group, Celanese Corporation, an independent petrochemical company. In my present capacity I am responsible for ensuring that the raw materials which we receive and the chemicals which we produce at Pampa, Bishop, Bay City and Clear Lake, Texas, Rock Hill, S.C., and Newark, N.J., move via the most economical means consistent with our service requirements and those of our customers.

I appear before you today to request that coal hopper cars be included as an item of "Alternative Energy Property" as defined in Section 1301 or S. 1472.

Celanese is a diversified producer of petrochemicals, fibers, plastics, coatings and specialty chemicals which will shortly convert one of its major manufacturing plants from gas to coal fired boilers for steam generation.

Our Pampa, Texas plant, which manufactures a variety of chemicals currently generates its required steam in gas fired boilers. It is our intention to replace these gas fired boilers at Pampa with coal fired boilers in mid-1979.

When this project is completed, Celanese will have spent approximately $70 million dollars to convert from gas to coal and we will not have increased our production capacity. The conversion project is one of U.S. industry's first affirmative responses to the proposed. National Energy Program and fully supports the nation's energy goals which urge the replacement of coal-fired boilers with gas-fired boilers. Of this amount, approximately $3.5 million dollars will be for coal hopper cars to transport the coal.

As a result of past practices with respect to unit train movements of western coal, the railroads require the shipper and/or receiver to furnish the necessary coal hopper cars. We are now in the process of obtaining a sufficient number of suitable hopper cars to handle approximately six hundred thousand tons of coal annually from western states to our Pampa, Texas plant.

The Carter energy legislation contains a provision for a tax credit for "equipment used for the unloading, transfer, storage, reclaiming from storage, or preparation. . . . of coal for use in, or with respect to a boiler, combuster, or facility, etc. . . ." We believe that this provision should be broadened to include an investment tax credit for the substantial capital which will be dedicated to coal car acquisition. After all, the need to acquire coal hopper cars results directly from the conversion of our boilers from gas to coal. We believe it only logical to extend the investment tax credit to coal hopper cars which must be obtained in order to make the entire conversion project workable.

Therefore, we suggest the definition of "Alternative Energy Property" contained in Section 1301 of S. 1472 include the following paragraph: "Rail hopper cars with automatic rapid bottom discharge gates and rail hopper cars with rotary couplers required for rotary dump operation used by manufacturing industries or utilities for the transportation of coal."

Mr. Chairman, In closing, I want to thank you for the opportunity to present this statement for inclusion in the record of these hearings.

DEERE & COMPANY,
Moline, Ill., September 16, 1977.

Hon. RUSSELL B. LONG,
Senate Office Building,
Washington, D.C.

DEAR SENATOR LONG: I urge you to vote to delete the provisions of the National Energy Act which tax the business use of oil and natural gas and to vote to substitute additional, flexible tax incentives in their place. The stated purpose of the use tax is to raise the price of oil and gas to business in order to encourage substitution of coal by existing and prospective industrial and utility consumers. Yet industry already perceives the need to convert to coal and other available resources because of the certainty of higher gas and oil prices in the future. By siphoning off huge amounts of taxes which would otherwise be used for capital conversion expenditures, the tax in reality will make conversion more difficult. In our own case, for example, conversion from oil and gas is currently taking place at the maximum pace that available capital resources will allow.

To make conversion expenditures more competitive with other uses of capital funds, we urge an additional 15 percent investment tax credit for alternative fuel equipment, a 3-year accelerated depreciation of conversion-related equipment and a tax credit for equipment idled by replacement. A more detailed discussion of our views on other aspects of the energy legislative proposals is attached for your further information.

I hope you will give our views your consideration as you vote upon the energy proposals.

Very truly yours,

R. F. DENIG, *Vice President.*

Enclosure.

Deere & Company Federal Energy Legislation Recommendations

SUMMARY

Two aspects of current national energy legislative proposals are of particular concern to Deere & Company. The first is the critical importance of stimulating the development of all near-term energy resources, rather than overemphasizing reliance upon coal. The second is the attempt to impose a new Federal layer of highly controversial and overly specific utility rate design requirements upon states.

Excessive reliance upon dramatic increases in coal production and massive industrial conversion to coal is unrealistic and unwise. National legislative proposals should:

1. Encourage the rapid development of all fuel resources. This can best be done by moving toward free markets for all fuels. Specifically, natural gas prices should be fully decontrolled on a phased basis; wellhead prices of crude oil should be fully deregulated, but if Congress feels compelled to impose a wellhead tax in lieu of deregulation, producers should be allowed a plowback deduction which would channel part of the tax into the search for additional energy supplies; and provisions to speed up and simplify to approval process necessary for adding nuclear generating capacity should be adopted.

2. Provide industry with the capital and flexibility necessary to convert facilities to alternative available fuel resources. This can best be done through a general reduction in the corporate income tax rate. Since Congress is not likely to adopt such a reduction at this time we recommend more specific, flexible tax incentives as the next best solution. Specifically, the proposed inflexible provisions taxing the business use of oil and natural gas should be dropped. In their place, additional tax incentives to encourage conversion to available alternative fuels should be adopted. These incentives should include an additional 15 percent investment tax credit for alternative fuel equipment, 3-year accelerated depreciation of conversion-related equipment, and a tax credit for equipment idled by replacement.

3. Recognize the increasingly critical role which utilities are likely to fill in the future because of their need to deliver increasing amounts of energy to industrial users who previously burned oil but do not themselves plan to burn coal. This should be done by specifically insuring that needs for rapid utility expansion will clearly be met.

Federal utility rate reform proposals contained in Part E of S. 1469 and Chapter 2 of H.R. 8444 would impose a new Federal layer of highly controversial and overly specific rate design requirements upon states. They would also encourage the integration of inefficient and inconsistent income distribution programs into present utility rate systems. The provisions should be cut back to:

1. Provide that utilities are required to charge customers on the basis of the cost of providing service.

2. Require that the FEA, along with the states, study and evaluate more sophisticated cost-related rate approaches such as time-of-use rates, voluntary load management programs, etc. If these approaches can be based upon actual costs experienced by the utility in providing the service and are found by state authorities to be economically and practically feasible, the Federal government should encourage state authorities to adopt them.

3. Delete the provisions requiring state adoption of controversial and ill-conceived marginal cost techniques.

4. Delete provisions requiring all states not having so-called "life-line" rates to hold hearings to determine whether such rates should be adopted.

If the utility rate reform proposals are not revised to this extent, they should be completely removed from the legislation.

INTRODUCTION

Deere & Company is an agricultural and industrial equipment manufacturer headquartered in Moline, Illinois. The Company sold $3.3 billion of products last year and employs 42,500 persons in the United States. As a major manufacturer and concerned employer, we strongly share the view that there is an urgent need for a coherent and coordinated U.S. energy policy.

The importance of the energy issue to our Company is clear. Most fundamentally, of course, shortages threaten the ability of the Company and its suppliers to continue operating. In addition, current energy costs to Deere & Com-

pany are already substantial and will clearly continue to rise in the future. Energy cost Deere & Company over $30 million in fiscal 1976 alone. We estimate that energy conservation and conversion expenditures over the next five years could cost over $75 million. While initial conservation expenditures will bring satisfactory returns on investment, future conversion expenditures are not as likely to carry such economic advantages.

Two aspects of the current national energy legislative proposals are of particular concern to us: (1) the importance of stimulating the development of all near-term energy resources, rather than overemphasizing reliance on coal, (2) proposals to impose a new Federal layer of highly controversial and overly specific utility rate design requirements upon states. This document discusses these issues and makes recommendations concerning them.

Development of all energy resources

Current energy situation

Our recommendations concerning the development of energy resources are based upon our current evaluation of the energy situation:

Near term U.S. energy resources are clearly inadequate and must be increased as rapidly as possible. In 1973 we imported approximately 29 percent of our oil needs. In 1977 we will import more than 50 percent of our oil at an annual cost of approximately $45 billion. Unless we produce more energy at home, our national industrial energy needs will not be properly met, our national security will be jeopardized, and the annual import dollar drain will siphon away still more dollars which could otherwise have been used to create jobs and stimulate our economy here at home.

It is clear that increased voluntary energy conservation efforts can bring about initial, rapid and major reduction in energy usage. Take an example from our own experience. Through concerted voluntary conservation efforts, our Company used nearly 11 percent less natural gas in the U.S. and Canada during this past year than it did in 1972.

We did this even though we have two more factories and 28 percent more manufacturing space than four years ago. By taking such action we saved 940 million cubic feet of natural gas in 1976—the equivalent of what it would take to heat 5700 homes for a year.

Yet it is also clear that conservation measures alone will not insure adequate energy supplies. It has been estimated that, even after conservation measures, by 1985 the nation will still be consuming about 25 percent more energy than it did last year.

Most major fuel burning industrial firms began the transition from oil and natural gas to coal or other alternative fuels several years ago when the fuel crisis became apparent and when fuel prices began to rise. Therefore, their energy conversion plans are well underway. In our own case, for example, conversion plans are well underway since 1972 and are currently being implemented at the maximum pace that available capital resources will allow.

It is unrealistic to expect the 400 million ton increase in coal production by 1985 and the massive industrial conversion to coal that the administration indicates it favors and expects. Environmental, labor and transportation requirements all pose extremely serious obstacles to rapid coal development and to the industrial use of coal. Each of these problems is likely to grow in scope in the next several years, rather than diminish. New, cleaner fuel resources, such as nuclear energy and newly discovered natural gas, may be available as quickly as much of our coal supplies are.

With continued emphasis on coal conversion alone, individual firms will likely turn to utilities to provide energy rather than face substantial environmental costs, risks of supply interruptions, individual units of electric generation and more capital intensive than the larger units used by utilities, and risks of possible future changes in public policy with respect to coal. Major businesses, for these reasons, and smaller firms caught by surprise by oil and gas shortages will thus likely become significantly more dependent upon utilities for their energy supplies. Meeting utilities' needs will therefore become even more crucial to keeping the economy healthy.

Recommendations

Given the situation just described, we believe that national energy legislative proposals should: (1) encourage the most rapid possible development of all fuel

resources and not rely excessively upon a complete near term transition to coal; (2) provide flexible tax incentives to encourage industries and utilities to convert to alternative available fuel sources and to allow businesses to retain adequate capital to accomplish the conversion; and (3) adequately recognize the increasingly critical role which utilities will likely fill in the future by providing increasing amounts of energy to industrial users who previously burned oil but do not themselves plan to burn coal.

To encourage the most rapid possible development of all fuel resources without overemphasizing reliance on coal, we believe that free markets for all fuels are required. There is no stronger, flexible incentives for conservation, conversion to more abundant fuel resources, accelerated development of new oil and gas reserves and energy research than ending artificial price constraints on fuels, allowing energy to command its true value in the market place. Specifically, we recommend:

1. That natural gas prices be fully decontrolled on a phased basis. The Administration proposal pegs the price of natural gas to the average price of its energy equivalent in domestic crude oil (Next year this is expected to translate into about $1.75 a thousand cubic feet, compared to the current $1.45.) Regulating natural gas prices at $1.75 Mcf or at any other artificial price is not the best way to meet the stated objective of generating greater supplies to meet market demand.

Greater production of natural gas can best accomplished through the deregulation of all new gas. To minimize the effect of rising prices on residential consumers. we recommend that deregulation be phased in over time and that the higher priced deregulated gas be directed to industrial or commercial markets.

2. That wellhead prices of crude oil be fully deregulated. If Congress feels compelled to impose a wellhead tax in lieu of deregulation, however, producers should be allowed a plowback deduction which would channel part of the tax into the search for additional energy supplies. The Administration's wellhead tax proposal would gradually bring the price of domestically produced oil up to the world price, starting next January 1, by imposing a tax (approximately $15 billion annually) when refiners buy domestic crude oil. To prevent a drastic loss of consumer purchasing power, this money would then be recycled to the general public, initially through income tax payments or special payments to those not paying taxes. Approximately $22 would be recycled to each adult in 1978. These funds would be more efficiently and productively spent if they were channelled directly to the search for additional resources.

3. That provisions be added which will speed up and simplify the approval process necessary for adding nuclear generating capacity. The administration proposed national energy plan assumes more than a tripling in nuclear power from 1976 to 1985. Yet it currently takes 10 years to bring a new nuclear power plant on line. Objections to nuclear projects should be resolved on their merits. They should not be permitted to prevail through the obstruction of the decision process itself.

To provide industry with the capital flexibility necessary to convert facilities to alternative available fuel resources, we believe that a general reduction in the corporate income tax rate is required. Funds for business investment must come from or are loaned on the basis of corporate profits after taxes. Since Congress is not now likely to implement such a reduction, we believe that more specific, flexibile tax incentives provide the next-best solution. Specifically, we recommend:

1. That administration-proposed provisions taxing the business use of oil and natural gas be deleted. The stated purpose of the tax is to raise the price of oil and gas to business in order to encourage substitution of coal by existing and prospective industrial and utility consumers. Yet industry already perceives the need to convert to coal and other available resources due to the certainty of higher gas and oil prices in the future. By siphoning off in taxes huge amounts of funds ($84 billion dollars between now and 1985) which would otherwise be used for capital conversion expenditures, the tax will in reality make conversion more difficult. In our own case, for example, conversion from oil and gas is currently taking place at the maximum pace that available capital resources will allow.

The proposed use tax, when coupled with the crude oil equilization tax which raises domestic oil prices to world levels, will also raise costs of oil and gas for business above world levels, adversely affecting U.S. firms' competitive position in international markets. The new Energy Secretary already has au-

thority under ESCEA, the existing coal conversion law, to order expanded use of coal in industrial facilities.

2. That the proposed energy legislation provide additional adequate tax incentives for the major investment to coal fired boilers and other alternative fuel equipment which the administration hopes to encourage. These programs are estimated to cost $49 billion for industry and $50 billion for utilities through 1985. To make conversion more competitive with other uses of capital funds, we urge an additional 15% investment tax credit for alternative fuel equipment, a 3-year accelerated depreciation of conversion-related equipment and a tax credit for equipment idled by replacement.

To recognize the growing role which utilities will likely play by providing increasing amounts of energy to industrial users who previously burned oil but do not themselves plan to burn coal, we recommend:

1. That careful consideration be given to utility company concerns that conversion of all existing plants to coal by 1990 are economically unfeasible and punitive, that current clean air requirements for coal fired boilers are excessive, and that development of nuclear generating stations should be expedited. Since many more industrial firms are likely to be relying on utilities for their resources, it is critical that these resources be available when required. Legislation should help insure that utilities' needs for rapid expansion will clearly be met.

National utility rate design policies

General principles

Our recommendations concerning Federal Utility rate reform proposals are based upon certain observations and principals which we believe are fundamental in this area:

Changes in rate design will not reverse or moderate the basic causes of increased electric rates. Inflation, recession, the oil embargo, environmental requirements and power plant cost increases due to construction delays have all been important factors causing rate increases. Rate design changes will have no impact upon these external causes of rate increases.

The key to fair and reasonable utility rates is cost of service. Accordingly, it is logical that the rates which a utility charges to its individual customers be based on these same costs. Cost-based rates insure that customers do not obtain energy at artificially low rates which encourage wasteful or inefficient uses. They also help assure the financial stability of utilities.

Income redistribution programs and other social policy programs should not be incorporated into already complex rate-making structures. Such programs cause less efficient energy allocations and constitute an extremely complex and inefficient way of achieving social objectives.

Specific rate design policies should not be established and implemented at the federal level. Substantial differences in load patterns and cost characteristics exist among utilities throughout the United States. These differences stem from such factors as fuel mix and availability, climatic conditions, the extent and nature of interconnections, pollution control regulations and the mix of residential, commercial, and industrial customers. For these reasons, specific rate design policies are best left to the individual state regulatory commissions, where decisions can be made in light of the specific characteristics applicable to each regulated utility. The addition of a new layer of Federal regulatory controls on already complex state structures at this time will only add additional costs and unnecessary uncertainty to current rate making processes.

Discussion

The administration's utility rate design proposals are at odds with the above principals. They would impose a new federal layer of controversial rate design requirements upon all states. In addition, they would encourage the integration of income redistribution programs into present utility rate systems.

Perhaps the most controversial and ill conceived of the legislative design provisions is the requirement that state electric rate procedures use "marginal cost" rather than "embedded cost" techniques to determine rates. Marginal cost techniques result in a design of rates which is based upon anticipated future costs; embedded cost techniques result in a design of rates which is based upon actual costs to date. A number of overriding considerations lead to the selection of embedded costs as greatly superior to marginal costs:

First, it is the embedded costs that are used by the regulatory commission to establish the legally permissible total revenue requirement of the utility.

Second, there is no agreed upon operational definition of marginal costs that can be used to calculate rates.

Third, even if marginal costs could be accurately specified, there is no reason to believe that pricing electric power at marginal costs would produce any more efficient allocation of society's resources than would pricing electric power at embedded costs.

Fourth, the basic causes of increased rates in recent years have been increases in the price of fuel, construction delays which led to higher plant costs, and inflation coupled with recession, which affected all aspects of the highly capital-intensive utility business. Marginal cost-based rate structures will have no impact upon these external causes of rate increases.

Fifth, since utilities are responsible for those costs actually reflected on the balance sheet, and those expenses actually shown on the income statement, marginal cost calculations produce costs that are totally at odds with utility operating requirements.

Sixth, much greater consensus of opinion exists on the use of embedded costs in conjunction with time-of-use pricing than exists with respect to the use of marginal costs. Accordingly, improvements in rate structure can be accomplished much more readily and effectively on the basis of embedded costs.

The Administration proposals would also mandate time-of-use (time-of-day and time-of-year) pricing. Deere & Company does not oppose time-of-use rates, provided they are based upon the actual costs experienced by the utility in providing the service and provided that the costs of implementing the rates do not exceed the cost savings derived.

There are a number of practical problems inherent in the adoption of time-of-use pricing, however; the increased labor dislocations and costs caused by massive changes to night-time work shifts, the cost of metering customers in such a way as to "distinguish consumption by time-of-day, the gauging of the potential reaction of customers to time of day rates, the consequences of load shifts if they occurred on a large scale (e.g., if industries moved to night shifts, commercial establishments stayed open different hours as a result, etc.) and so. Because no one yet has sufficient data in these areas, it would not be wise to plunge ahead without further information. A number of studies on time-of-use pricing are currently being funded by the Federal Energy Administration. The studies should be completed and evaluated prior to adoption of time-of-use rates. The data from the studies should then be made available to state authorities for possible application to the utilities within their states.

The House-passed legislation also requires all states which do not have so-called "lifeline" electric rates to hold hearings to determine whether such rates should be adopted. In doing so, it encourages adoption of the lifeline rate concept. Under this concept, the rate structure is used to benefit a group or class of residential customers defined as "needy" or all residential customers below a certain use level, by offering them below-cost subsidized rates. These lower rates essentially constitute a form of income redistribution.

While at first blush this concept is somewhat appealing, there are a number of practical problems with this approach. First, it is based upon the implicit assumption that low electric use is correlated with low income or "need". Studies have shown that this is not necessarily the case. Because it is not, lifeline rates are a very inefficient means of benefiting the needy. Direct benefits through established social assistance systems provide far more focused assistance for those needing it. Second, it is not clear that lifeline rates bring about the net benefits to low income individuals that they are designed to accomplish. Because other customers, including industrial customers, subsidize lifeline rate usage the higher cost of electricity to industrial and commercial customers is eventually reflected in the cost of the products and services sold. Percentage mark ups and sales taxes are then applied to these higher product and service prices. Because of this, it is qustionable whether lifeline customers receive a net benefit. Third, the problem of administering lifeline rates fairly is nearly insurmountable. For example, many low income users live in apartments where the cost of electricity is included in the rent. In many cases, these complexes are served under commercial rates. The lifeline exemption would penalize, rather than benefit these users, since they would then be helping to subsidize lower residential rates.

Lifeline rates pose other problems as well. By deviating from the cost of service

principal, allowing customers to receive energy at artificially low rates, they encourage wasteful and inefficient uses. In addition if the lifeline burden causes rates to differ from actual costs by a large enough margin, self generation becomes attractive for industrial customers, industrial loads are thus lost to the utility, and the average cost of electricity to remaining customers, including residential customers, is increased. Also, a lifeline burden on U.S. industry merely serves to increase the relative economic attractiveness of foreign made products. For all of these reasons, Federal legislative encouragement of state adoption of lifeline rates is highly inappropriate.

Recommendations

For the reasons described above, we recommend:

1. That national energy legislative proposals should require that all utility charges to customers be based upon cost of service.
2. That the Federal Energy Administration, along with the states, study and evaluate other more sophisticated cost-related rate approaches such as time of use rates, voluntary load management programs, etc. If these approaches can be based upon actual costs experience by the utility in providing the service and are found by state authorities to be economically and practically feasible, the Federal government should encourage state authorities to adopt them.
3. Provisions requiring use of the controversial and ill conceived marginal cost technique should be deleted.
4. Provisions requiring all states not having "lifeline" rates to hold hearings to determine whether such rates should be adopted should also be deleted.

If the utility rate reform proposals are not revised to this extent, they should be deleted.

NATIONAL AUTOMOBILE DEALERS ASSOCIATION,
McLean, Va., September 16, 1977.

Hon. RUSSELL B. LONG,
Senate Office Buiding,
Washington, D.C.

DEAR SENATOR LONG: On behalf of the National Automobile Dealers Association and its 21,000 franchised new car and truck dealers, I would like to take this opportunity to express our strong opposition to the automobile fuel economy excise tax contained in H.R. 8444 and S. 2057.

NADA understands that the Senate Finance Committee will be marking up the tax aspects of the President's energy conservation proposal contained in H.R. 8444 this coming week. We would strongly urge you to vote in favor of deleting the ill-advised and unnecessary auto fuel economy excise tax for the following reasons.

I. EPCA WILL GET THE JOB DONE

With the Energy Policy and Conservation Act (EPCA fleet average standards just now going into effect with respect to model year 1978 passenger vehicles, NADA believes strongly that it is redundant at this time for the Congress to be considering still further governmental regulations in the fuel economy improvement area. The EPCA standards will result in nearly a 100 percent fuel economy improvement by model year 1985 when the EPCA fleet average standard will reach 27.5 mpg. These well thought out standards should be given a chance to do the job they were designed to do.

From an energy conservation perspective, the EPCA standards which are now law will result in gasoline savings ranging from approximately 9.6 billion gallons per year in 1985 (590,000 barrels of oil per day) to about twice that amount in the year 1995, relative to a 1980 model year 20 mpg. baseline. These figures are not auto industry figures; they were presented to the Senate Commerce Subcommittee on Science by NHTSA Administrator Joan Claybrook on July 14, 1977. These figures tend to understate the real savings under EPCA, since they do not take into consideration the fuel economy gains in model years 1978 and 1979 because of EPCA. One of the National goals of the National Energy Plan is to reduce gasoline consumption by 10 percent in 1985—the present EPCA standards will accomplish, indeed surpass, this goal.

II. EPCA STANDARDS SET BY DOT FOR MODEL YEARS 1981–1984 ACCELERATE FUEL ECONOMY PROGRESS

It should also be noted that DOT has now administratively set the EPCA standards for model years 1981–1984 (Congress set the standards for model years 1978–1980 and 1985 model year, with DOT directed to administratively set the EPCA standards for model years 1981–1984). DOT has in effect speeded up the fuel economy improvement effort by requiring most of the improvement necessary to meet the final 27.5 mpg. goal to be accomplished by model year 1983.

III. SENATE HAS ADOPTED MINIMUM STANDARDS AND DOUBLED PENALTIES UNDER EPCA

NADA would note that every major domestic manufacturer has publicly stated it will meet the final EPCA standard of 27.5 mpg for model year 1985. As an additional incentive to insure that this does occur, the full Senate has this week voted to double the present penalties under EPCA for the failure by a manufacture to meet the applicable fleet average economy standard in any model year. This provision is contained in the conservation section of S. 2057 which passed the Senate September 13th.

While NADA continues to believe that further Congressional action pertaining to auto fuel economy improvement is unnecessary due to the presence of the EPCA fleet average standards, we would note the action of the full Senate this past Monday in voting to adopt the Metzenbaum minimum fuel economy standards. These standards, contained in S. 2057 as passed by the Senate, would flatly prohibit the sale of any model year 1980 car which does not obtain at least 16 mpg. The minimum requirement would increase 1 mpg. each model year until a final minimum standard is reached in model year 1985 of 21 mpg.

NADA believes that the adoption of the Metzenbaum minimum fuel economy standards by the Senate removes any possible justification or need for the excise tax proposal contained in the bill. Since the full Senate has already expressed its approval of the minimum standard approach as an additional requirement aimed at eliminating the so-called "gas-guzzlers," we would urge you and your fellow members of the Finance Committee to favorably consider deleting in its entirety the excise tax provisions of the bill.

IX. CONCLUSION

As NADA has testified to on a number of occasions before both the 95th and 94th Congresses, excise taxes on automobiles based on fuel economy offer highly uncertain benefits in terms of fuel-economy conservation. On the other hand, excise taxes based on fuel economy may have a significant adverse economic and employment impact on those dealers who sell vehicles which will be affected by the tax. The attached statement sets forth in some detail a number of reasons justifying, in NADA's view, Congressional rejection of the excise tax approach to the fuel economy improvement issue.

In summary, NADA does not believe that the excise tax proposal contained in H.R. 8444 will result in any significant fuel economy improvement over and above those improvements which will be achieved because of the EPCA standards which are already law. Additionally, the adoption of the Metzenbaum minimum fuel economy standards by the Senate removes any possible rationale for imposition of excise taxes on autos based on fuel economy.

NADA would urge that you favorably consider deletion of the auto excise tax provision during Finance Committee mark up this coming week.

Thank you for this opportunity to provide our views on this extremely important issue for franchised dealers. If we can be of any further assistance in this matter, please do not hesitate to contact us.

Sincerely yours,

REED T. DRAPER, *President*.

Enclosure (1).

STATEMENT OF THE NATIONAL AUTOMOBILE DEALERS ASSOCIATION BEFORE SENATE FINANCE COMMITTEE HEARINGS ON AUTO FUEL ECONOMY SECTION OF NATIONAL ENERGY ACT S. 1472

On behalf of the National Automobile Dealers Association and its 21,000 franchised new car and truck dealers, we thank you for this opportunity to appear

and present our views on the President's automobile fuel economy excise tax/rebate proposal as contained in the National Energy Act, S. 1472.

In his April energy messages to the American people and the Congress, the President set forth his views as to the scope of the energy problem and his recommendations for both short- and long-term solutions.

One aspect of the solution in the view of the President and his Administration is to encourage substantial improvements in auto fuel economy via the stimulus of a tax/rebate system to encourage the purchase of fuel efficient cars, and to discourage the purchase of fuel inefficient cars.

NADA strongly agrees that auto fuel economy must improve.

However, the proposed excise tax/rebate program will not result in any significant fuel savings over and above those fuel economy gains which will be achieved under the present fuel economy standards in effect. What is certain, on the other hand, is that the program is going to cost the American consumer and Federal Treasury substantial sums of money. The program is also going to create serious economic problems for a selected portion of the dealer population specializing in family size passenger vehicles.

I. THE MANDATORY FUEL ECONOMY STANDARDS WILL GET THE JOB DONE

The mandatory fuel economy standards which take effect in model year 1978 should be given the opportunity to work. These standards which the Congress enacted in 1975 (with the strong and active support of NADA, we might add) will accomplish an increase in the average fuel economy of the new car fleet to 27.5 miles per gallon by 1985. When compared to the average fuel economy of about 14.0 miles per gallon in 1974, the mandatory fuel economy standards program will achieve a 100 percent improvement in a single decade.

Furthermore, the interim standards for model years 1981 through 1984 set by the Department of Transportation represent an acceleration of the fuel economy effort by requiring most of the final goal of 27.5 miles per gallon to be met by model year 1983.

NADA feels strongly that achieving a 100 percent improvement in fuel economy demonstrates in a very concrete way the auto industry's commitment to meeting its fair share of the conservation burden.

Furthermore, the mandatory fuel economy standards will get the job done without asking the American people to pay one dime in taxes.

The standards will work if given the opportunity; give them the chance.

II. NADA'S OBJECTIONS TO THE EXCISE TAX/REBATE PROPOSAL AS SET FORTH IN S. 1472

(a) *Disproportionate Impact of Excise Tax on Certain Consumers and Dealers.* NADA would urge the Congress to consider the disproportionate impact of an excise tax based on fuel economy on the segment of the franchised dealer population which sells family size vehicles.

Unlike the mandatory fuel economy standards which spread the impact across all dealers (because of the fleet average approach based on the entire production of each individual auto manufacturer), the burden of the excise tax will fall almost exclusively on those dealers who sell family size vehicles.

Dealers do not receive new car inventory on a consignment basis; rather, the dealer pays the full invoice plus any excise tax which may be applicable. Those dealers receiving family size vehicles subject to the President's proposed excise tax will be placed in an extremely difficult economic position.

On the other hand, the manufacturer of the fuel inefficient vehicle subject to the excise tax will have already received full payment for the vehicle including full reimbursement of the excise tax. The full burden of marketing the vehicle to an ultimate consumer will fall on the dealer, not the manufacturer. To market such vehicles, the dealer may be forced to absorb a portion of the excise tax.

Additionally, the dealer and the ultimate consumer will incur added costs for financing, since the additional cost of the excise tax will simply be financed by the average consumer purchaser of the new vehicle. Similarly, additional costs will be incurred by the dealer for his higher inventory financing (floor planning).

In summary, the manufacturer will have little if any impetus to minimize production of these fuel inefficient vehicles (within the parameters of the mandatory fuel economy standards), since the manufacturer receives full reimbursement of the excise tax from the dealer upon delivery. Dealers and consumers will absorb additional costs, including higher financing costs, in the sale of such vehicles. Despite the additional costs to dealers and to consumers, these less fuel inefficient vehicles will still be sold and operated by American consumers.

The mandatory fuel economy standards place the responsibility for improved fuel economy on the manufacturers. An excise tax based on fuel economy, on the other hand, attempts to shift this burden to franchised dealers and those consumers who need or desire traditional family sized vehicles.

NADA continues to argue strongly that the shifting of the responsibility for improved fuel economy away from the manufacturer will not add to fuel economy conservation and will only result in increased costs for a certain segment of both the franchised dealer population and American consumers.

(b) *The Exclusion Of Imports From Eligibility For Rebates Is Discriminatory And A Violation Of The GATT Agreement.*

NADA strongly opposes the rebate program, particularly in terms of its exclusion—at least initially—of imports from eligibility for such rebates. In NADA's view, this is flatly discriminatory and a direct violation of the GATT Agreement. The extremely serious consequences of such a step might do serious long-term damage to our economic and commercial relationships with our major trading partners.

(c) *The Excise Tax May Adversely Impact On New Car Sales, Auto Industry Employment, And Federal Energy Conservation, Pollution Abatement, and Safety Goals.*

In a business so dependent upon consumer confidence, the mere discussion of an excise tax on new cars by the Congress can lead to consumer uncertainty and reduced sales.

Many potential customers may simply decide to hold on to the used car they presently drive. This may be particularly true with respect to moderate and lower income individuals who will be priced out of the market by the excise tax.

Many family size cars are presently purchased by moderate and lower income working people. For example, a recent study by the Bureau of Labor Statistics indicates that the average American family now spends more money on transportation than on food. The very people who will be least able financially to bear the burden of the tax will be the most seriously affected.

If potential consumers desiring family size vehicles do not choose to purchase a new vehicle, then the sales and employment consequences on the auto industry could be extremely serious. A heavy burden will fall on the auto workers. An equally heavy burden will fall on those dealers and their employees who currently sell intermediate and standard size model lines.

As noted above, NADA believes it extremely important that the Congress realize that the burden of the excise tax will not fall evenly on all franchised dealers. The bulk of the burden will fall on those dealers selling the models which will be subject to the tax.

A decrease in new car sales resulting from the excise tax program will impact negatively on a number of auto related goals already set by the Congress. If many potential new car purchasers opt to keep their present vehicle, then:

(1) Fuel economy suffers—1978 and later models across the board will get much better fuel economy than cars presently on the road;

(2) Auto pollution control effects will suffer—1978 and later models will more effectively reduce auto emissions;

(3) Vehicle safety suffers—1978 and later models will meet many safety standards which were not applicable to most vehicles currently on the road.

The net effect of the excise tax program may prove to be less fuel efficiency, a small reduction in auto pollution, and less safe autos on the Nation's highways.

(d) *47.6% of American households own only one car*, and are dependent upon that car to satisfy many requirements and needs, such as transportation to work, school, shopping, recreational activities, and personal trips. In many instances, these families require a reasonable size vehicle to meet these various needs.

Irrespective of whether Congress places a tax on these size vehicles, these households are in many instances going to continue to buy the size of vehicle which they feel they need.

(e) *Analysis Of President's Excise Tax/Rebate Program In Terms of Fuel Conservation And Fiscal Impacts—1977 and 1978.*

NADA has analyzed the President's proposed excise tax and rebate schedules through the end of model year 1978 in terms of the fuel conservation and fiscal impacts (copy attached).

NADA would like at this point to summarize the conclusions of its analysis:

(1) *In 1978, the program will cost the Federal Treasury nearly $100 for each gallon of gas saved.*

Based on the attached detailed analysis of the likely impact of the proposed excise tax/rebate proposal, NADA estimates that in model year 1978:

(1) The tax/rebate program will cause a shift in demand involving approximately 50,000 new cars, i.e., 50,000 new car purchasers will buy a different car (smaller, more fuel efficient) as a direct consequence of the tax/rebate program;

(2) The program will save about four thousandths of one percent (0.004 percent) of current annual gas usage—that's about 20 minutes worth per year at the present annual consumption rate;

(3) The program will cost individual American consumers about $240 million in excise taxes in 1978 alone;

(4) The proposed rebate schedule for 1978 will pay out $400 million over and above the amount collected in excise taxes;

(5) The program will thus result in the Federal Treasury paying out nearly $100 for each gallon of gas saved in 1978.

While the benefits of the program will tend to be cumulative over the coming years, it will clearly be a great number of years before the benefits in terms of gasoline conservation even begin to approach the costs of the program to the Federal Treasury.

In short, the program asks the American consumer and the Federal Treasury to pay a very large price tax *now* for speculative benefits in terms of gas savings a number of years in the future.

(2) *In 1977 and 1978, the tax/rebate program will cost the Federal Treasury some $600,000,000 to save 20 minutes worth of annual gas consumption.*

The President has proposed making the rebate feature of the plan retroactive to May 1, 1977.

According to NADA calculations, this proposal alone would cost the Federal Treasury over $200 million.

The net outlay from the Federal Treasury for model years 1977 and 1978 would be $600 million ($200 million for 1977 model rebates, plus $400 million in excess rebates over excise tax revenues for model year 1978) to save 20 minutes worth of annual gas consumption.

III. SUMMARY

NADA believes strongly that the mandatory fuel economy standards already established by the Congress and the Department of Transportation will insure substantial progress in our efforts to improve fuel economy over the coming years.

Further, NADA believes that the President's excise tax/rebate program will not contribute in any meaningful way to fuel economy improvements over and above those which will result from the fuel economy standards already mandated.

On the other hand, the excise tax/rebate program has a very real potential for causing substantial disruption in the auto industry as a whole, and that segment of the dealer population in particular which sells family size vehicles. Additionally, the excise tax will force a certain segment of American consumers to pay additional taxes.

The excise tax/rebate proposal will, in NADA's view, add very little if anything to the fuel economy effort and will adversely impact on franchised dealers and consumers; it should be deleted from the energy conservation legislation now under consideration by the Congress.

Thank you.

Analysis of Fuel Conservation and Fiscal Impacts of Auto Excise Tax/Rebate Program 1977 and 1978

The purpose of the auto excise tax/rebate program is to encourage a shift in demand away from so-called gas guzzlers and toward more fuel efficient vehicles.

The following is an analysis of the likely impact of the program in model year 1978.

I. DETERMINATION OF THE NUMBER OF CARS AFFECTED

A. Assumption

The fleet average fuel economy for each domestic manufacturer will increase one mile per gallon over model year 1977.

Basis

It is estimated that the average new domestic unit sold in 1978 will achieve a one mile per gallon fuel economy gain over 1977. This is a conservative estimate since preliminary announcements by GM indicate that increases greater than this are expected for their models. Additionally, Ford and Chrysler will have to make increases in sales weighted fuel economy of 0.9 and 1.4 miles per gallon respectively in order to meet the Federally mandated 18.0 mile per gallon requirement.

B. Assumption

The excise tax/debate schedule proposed by the President is enacted into law.

Basis

H.R. 6831, pg. 146 and pg. 154.

C. Conclusion

48,412 new car sales will be affected in model year 1978 by the excise tax/rebate program.

Proceeding from the estimated overall one mile per gallon increase, it follows that according to the Administration's proposed tax/rebate schedule, and the attached table on 1977 sales by mileage class that 26 percent of all domestic cars sold in 1978 will be subject to a tax. The average price of those cars subject to the tax in 1978 will be approximately $7,000, and the average tax imposed on them will be $100. Accordingly, the tax can be considered as a 1.4 percent price increase. Then making a liberal estimate (1.4) for the cross-elasticity of demand between gas guzzlers and nongas guzzlers, it follows that the number of units affected in a 9.5 million sales year will be 0.26, 0.014, and 1.4—48,412.

II. DETERMINATION OF EXPECTED GASOLINE SAVINGS

For each mileage category less than 18 miles per gallon, the number of cars was multiplied by .02 (the previously determined 2 percent relative decline) then multiplied by 14,500 (Department of Transportation estimate for the average miles traveled per year for a new car). The difference between this figure divided by the car's actual mileage class and divided by 18 gives an estimate of the gallons saved in that mileage class. Summing over all mileage classes gives 4,400,000 gallons.

The savings will be .004 percent of current annual usage—4.4 million gallons divided by 110 billion gallons.

0.004 percent of 1 year equals approximately 20 minutes (35 days, 24 hours, 60 minutes, and 0.00004 savings equals 21).

III. TOTAL EXCISE TAXES PAID IN MODEL YEAR 1978 WILL BE $240,000,000

As previously determined, 26 percent of all cars will be subject to the tax in model year 1978. Also as previously determined, 2 percent will avoid the tax by shifting purchases. Thus, 98 percent of the 26 percent will choose to pay the tax. Based on the proposed excise tax schedule in H.R. 6831, the average tax paid will be $100 per car.

The total amount in excise tax paid will be:

Unit sales	9,500,000
Percent subject to tax	0.26
Percent that pay tax	0.98
Average tax	100
Total excise tax paid, 1978	$242,000,000

IV. REBATES WILL EXCEED TAX RECEIPTS BY OVER $400,000,000

Proceeding from the assumed overall one mile per gallon increase, the average excess of rebates over taxes is found to be $42.65 per car. Multiplying by assumed domestic sales of 9.5 million units in 1978 gives a total of $405 million.

V. THE COST PER GALLON SAVED WILL BE $92

Using the gallons saved figure from above, the cost per gallon saved would be: $405 million over 4.4 million gallons equals $92 per gallon.

Estimate of 1977 Domestic Sales by EPA Mileage Class

EPA mileage class:	Percent of total sales
36	0.52
65	-----
34	-----
33	.21
32	-----
31	-----
30	2.24
29	.31
28	.84
27	.76
26	1.35
25	.01
24	3.23
23	.49
22	1.91
21	1.62
20	9.68
19	8.98
18	21.45
17	20.52
16	13.90
15	7.65
14	1.95
13	2.11
12 or less	.27

NOTES.—Since imports will not qualify for rebates (at least initially), they have not been included in the percentage of total sales figures for vehicles obtaining 18 miles per gallon or greater. The number of imports which obtain less than 18 miles per gallon, and therefore subject to the tax is statistically insignificant in terms of total annual sales.

STATEMENT OF THE AMERICAN PUBLIC TRANSIT ASSOCIATION

The American Public Transit Association (APTA) represents the urban transit industry and its member systems transport 90 percent of the public transit ridership throughout the country.

In this capacity APTA respectfully urges the Senate Finance Committee to approve the language in the House-passed National Energy Act (H.R. 8444) to remove existing federal excise taxes on local, intercity and school buses.

Under present law, privately owned bus systems pay federal excise taxes on bus purchases, fuel, lubricating oil, tires and replacement parts. These excise taxes are archaic, inequitable and definitely not in the public interest. They place an additional cost burden on local transit systems which are already under severe financial strain.

President Carter in his energy tax proposals recommended removal of the 10 percent excise tax on bus purchases. Local transit buses are already exempt from this excise tax, but buses operating between cities and privately-owned school buses are not. APTA supports removal of the excise tax on all buses as a positive step to encourage use of public transportation as a means of conserving energy.

In line with the President's proposal to remove the excise tax on bus purchases, the following additional excise taxes on local transit, intercity and school buses were also removed by the House in passing H.R. 8444 (sections 2026–2028):

FUEL TAX

A federal excise tax of 4 cents a gallon is imposed on gasoline and on diesel and special motor fuels (Sec. 4081 and 4041 of the Internal Revenue Code). A refund of 2 cents a gallon is provided for fuel used by local transit systems providing scheduled commuter transportation. H.R. 8444 provides a refund of the full 4 cents a gallon when used by buses furnishing transportation to the general public or in school bus operation.

LUBRICATING OIL TAX

A manufacturers excise tax of 6 cents a gallon is imposed on lubricating oil (Sec. 4091 of the Code). H.R. 8444 provides for a refund of this tax when the lubricating oil is used in a bus used predominantly in furnishing transportation to the general public or by school buses.

EXCISE TAX ON REPLACEMENT BUS PARTS

A manufacturers excise tax of 8 percent is imposed on replacement parts purchased for use on trucks and buses (Sec. 4061(b) of the Code). There is no excise tax on automobile parts. H.R. 8444 removes this excise tax on replacement parts used on buses.

EXCISE TAX ON TIRES

Privately-owned bus systems pay a federal manufacturers excise tax on tires and tubes of 10 cents a pound and on tread rubber of 5 cents a pound [Sec. 4071 (a) of the Code]. H.R. 8444 provides that such tax would not apply in the case of tires, inner tubes or tread rubber sold for use on buses used predominantly in furnishing transportation to the general public or by school buses.

HIGHWAY USE TAX

Motor vehicles in excess of a gross weight of 26,000 pounds are subject to a highway use tax of $3.00 a year per 1,000 pounds (Section 4481 of the Code). Local transit buses are exempt from this tax if they meet the 60-percent "passenger fare revenue" test set forth in Section 6421(b)(2) of the Code. Bus fares of 60 cents or less qualify for such exemption if they total at least 60 percent of total fare revenues. However, because of inflationary pressures over the years, this exemption is becoming outdated.

The House Ways and Means Committee in marking up the tax provisions of H.R. 8444 did not consider removal of this highway use tax on buses. We recommend that the Finance Committee add language to the bill to remove this weight tax on buses used predominantly in furnishing transportation to the general public. This would have the effect of (1) preserving the present exemption for local bus transit systems and (2) removing the tax intercity buses now pay which amounts to $1.2 million a year. School buses are not subject to the tax as they are under 26,000 gross pounds.

REASONS FOR EXEMPTION

The annual revenue realized by the Federal government from these excise taxes on buses, bus parts, tires, fuel and lubricating oil is estimated by the staff of the Joint Committee on Taxation to be $25 million a year. It is an added burden which privately-owned bus systems no longer can afford. Nor are such taxes in the country's best interest as they thwart rather than contribute toward adequate and up-to-date transit systems able to provide fast and efficient transportation to the maximum number of people with the greatest energy efficiency of any mode of transportation.

Repeal of these antiquated excise taxes on buses is consistent with the interest of Congress in preserving and encouraging adequate transit systems and in conserving energy. The pending energy tax bill is an appropriate measure for removing these inequitable taxes, and the American Public Transit Association urges the Finance Committee to take such action.

NATIONAL MINERAL WOOL INSULATION ASSOCIATION, INC.,
Summit, N.J., September 12, 1977.

Senator RUSSELL B. LONG,
Chairman, Senate Finance Committee,
Russell Senate Office Building,
Washington, D.C.

DEAR SENATOR LONG: The National Mineral Wool Insulation Association, Inc. (NMWIA) requests to go on record with the Senate Finance Committee in its Hearings relating to the proposed Tax Credit for residential insulation. The time

restraints for these Hearings made it impossible for us to present these statements in person.

The membership of the National Mineral Wool Insulation Association consists of the majority of the manufacturers of mineral fiber insulations for buildings. This includes both rock wool and fiberglass in the form of batts, blankets and loose wool. The production of its members represents in excess of 90% of all mineral fiber manufactured for building insulation.

One of the more significant items relating to the consumer and energy conservation in the home is the proposed tax credit for residential insulation expenditures.

NMWIA favors the tax credit only if the period of credit is extended to nine to ten years to cover supply of materials alone. The mineral fiber industry is operating in a "sold out" condition due to an unprecedented demand for insulation products both in new construction and retrofitting. We anticipate that a balance in supply and demand will be achieved as producers implement their expansion programs over the next five years. The dramatic rise in use of cellulosic insulation and increased use of mineral wool and chemical foams will help achieve that balance.

Had the insulation tax credit been available three years ago, it would have served as a significant incentive for the addition of insulation to existing homes resulting in savings of energy. The dramatic rise in the cost of fuels has provided an economic incentive sufficient to induce cost conscious homeowners to reinsulate and weatherize their homes. A tax credit today would add little to that incentive and would be an unnecessary drain on the Treasury.

If passage of a tax credit should be inevitable, overstimulation of an already oversold market as a result of a short term tax credit could be a disservice to the consumer. Consumers could end up settling for products that are undesirable, of poor quality and even unsafe.

Government stimulation of the insulation market might prove to be a bonanza for the less than scrupulous persons who could take advantage of energy conservation objectives. Actions being taken to reduce this possibility include: "Recommended Criteria for Retrofit Materials and Products Eligible for Tax Credit" being developed by the National Bureau of Standards; the National Voluntary Laboratory Accreditation Program for the testing of thermal insulation by the Department of Commerce; and voluntary actions being taken by many utilities, some residential insulation contractors, and mass merchants. These programs should be supported and encouraged in prospective legislation and, once adopted, widely publicized by the government.

Final prices to end users are more influenced by elements in the distribution channel than by the manufacturer. Overstimulation could create localized shortages which can encourage escalated pricing at retail unknown to, and not controllable by, the producer.

NMWIA proposes several concepts for consideration as visable means of avoiding the detrimental effects of a short-term tax credit. These include:

1. Delay of the implementation of a tax credit for a period of a year or two until industry expansion programs make greater capacity available.

2. A combination of direct grants to low-income homeowners for a two to three year period followed by a period of tax credits for the rest of the population might prove useful in sustaining a more level demand.

3. An extension of time for a tax credit on a structured basis. Two approaches are worthy of consideration.

(a) Canada is reported to have initiated a program which stretches over seven years, partly to assure that there will be sufficient insulation for older houses and to allow for higher insulation standards in new homes. Initially only homes built before 1920 will be eligible and, as the program progresses, newer homes will be added.

(b) A structured program based on the income of the individual. It should not be difficult to establish up to nine or ten categories based on income, starting with those in the lower income levels.

Members of NMWIA will appreciate the consideration of the Senate Finance Committee of the above proposals and will be available at your convenience to discuss these and related subjects.

Sincerely,

SHELDON H. CADY,
Executive Vice President.

ATLANTIC RICHFIELD CO.,
Los Angeles, Calif., September 20, 1977.

Hon. RUSSELL B. LONG,
Chairman, Senate Committee on Finance,
Dirksen Senate Office Building,
Washington, D.C.

DEAR SENATOR LONG: You recently inquired of Mr. R. G. Daniel, an Atlantic Richfield representative appearing before the Senate Finance Committee in connection with hearings on H.R. 8444, whether our Chairman, Mr. R. O. Anderson, or I have made statements that Atlantic Richfield and the oil industry in general are "awash in cash". Neither Mr. Anderson, nor I, nor to our knowledge any other authorized Atlantic Richfield representative has made such a statement. Please permit me to take this opportunity to provide you with certain facts and some personal insights on this matter, so as to clarify the record.

Atlantic Richfield has increased its debt in recent years in order to find, develop and bring to market more energy for American consumers. Our total debt, including production payments, has risen from $1,198,000,000 to $3,905,000,000 during the 3½ year period from January 1, 1974 to June 30, 1977. Such debt increase resulted from the fact that our capital expenditures during those 42 months totaled $5,355,000,000 while our net income during that same period totaled only $1,737,000,000. Far from being "awash in cash", as of September 9, 1977, Atlantic Richfield's short-term debt alone, mainly commercial paper, exceeded marketable security investments by $271 million.

Debt of the 16 largest American oil companies has also increased dramatically. From December 31, 1967 to December 31, 197, debt of these entities increased from $10.3 billion to $32. billion and the percentage of debt to total capitalization jumped from 19.6 percent to 30.9 percent.

Even though Atlantic Richfield has pushed its total debt ratio (43.5 percent at December 31, 1976) near the limit considering prudent stewardship of shareholder funds, there is perhaps some unused borrowing capacity in certain of the 16 largest petroleum companies, and probably in a few isolated instances a less meaningful surplus of cash and marketable securities awaiting investment. For that financial capacity to be put to work for our country requires we feel, continuing improvement in the energy investment climate. We believe we need to bring an end to government regulations that require oil and gas to be sold at a price less than the cost of replacing such reserves. The opportunity must be present to take on the enormous exploratory risks in frontier areas and recover those costs, along with a return on development costs, comparable with the return available on the average in American manufacturing industries. This, in turn, requires elimination of many of the uncertainties surrounding the oil industry such as: continuing threats of horizontal divestiture and vertical divestiture; proposed limitations on the ability to invest in other sources of energy and the facilities necessary to bring such energy to market; protracted delays and litigation from government and private environmental groups; and retroactive changes in regulatory practices that directly alter the financial return from investments.

We most appreciate your continuing efforts to improve the environment for investment by American energy companies. I am confident that improvement in the equity capitalization and earnings potential of the industry will produce further borrowing and investment in the energy sector by companies such as Atlantic Richfield which already have assumed extensive debt in order to do the best possible job for the Nation in the development of new energy supplies.

Sincerely yours,

T. F. BRADSHAW.

STATEMENT OF THE INDEPENDENT GASOLINE MARKETERS COUNCIL

1. WHO WE ARE

The Independent Gasoline Marketers Council is a trade association made up of large retailers of gasoline who buy at wholesale from refiners and sell the product under their own brand names.

Lacking national advertising, most members rely on price competition to attract business and low overhead and high efficiency to stay in business.

We account for 5 to 7 percent of America's retail gasoline sales and we are an important factor in street price competition.

2. PRESENT SITUATION

Through the tax laws, and through a program of price controls which were supposed to help us, the U.S. government as been subsidizing our competitors, the integrated refiners. Instead of using the government subsidies to develop domestic crude production or to build new domestic refineries, the subsidized integrated refiners have increased their OPEC crude production investment and increased their share of the U.S. retail market by building new gasoline stations.

The price control plan has failed completely. Domestic crude prices are controlled but as a practical matter domestic wholesale product prices are not. The wholesale prices for gasoline in the United States has stayed just below the world wholesale gasoline price for three years. In recent months, the U.S. product price has exceeded the world price even though all foreign product uses OPEC priced crude. The refiners have pocketed the difference, windfall profit of 6 cents a gallon.

Because FEA has never effectively audited a refiner the consumers never got the benefits of crude oil price controls. The only restraint on U.S. wholesale price has been the threat of product imports.

This has cost the customers $6 billion a year. It has cost us the ability to compete fairly in the marketplace. We can not knock heads with a competitor who is getting a $6 billion subsidy.

The allowance of a foreign tax credit for payments to OPEC has made matters worse because it has subsidized OPEC production. Major integrated international companies with Saudi production have a $2 to $3 a barrel advantage over domestic competitors on imports. The advantage is based on a U.S. tax ruling. As a result it costs less in real terms to produce a barrel of oil in Saudi Arabia than it does anywhere else on Earth.

The price advantage of Saudi crude comes from U.S. taxpayers. It is used to destroy U.S. competition and increase our reliance on OPEC. It should be eliminated.

3. THE REMEDY

A. Crude oil equalization

We strongly support the Crude Oil Equalization Tax. We believe that when it passes, all refiners will be on an equal footing. The windfall profits will go to the Treasury and then back to the taxpayers where the money belongs.

We are opposed to the development of an energy "fund" or a "plowback". The major financial problem in the petroleum industry is that the existing energy companies have more money than they can possibly use. Mobil bought Marcor and a recent Forbes article said Exxon's biggest problem is excess cash and a lack of investment opportunity.

Despite all this spare cash and all the "new oil" production incentives, domestic production is down and will continue to decline. Giving money to Mobil and its sisters will not change the hard facts of geology. It may produce a merger of Exxon and Sears.

B. Fee free imports

The only effective control on U.S. product prices for the last three years has been foreign competition. Retail prices have not been close to the allowable FEA "ceiling" for three years.

FEA's price regulation has been worthless. It's own task force reports that it might clean up the pending backlog of audits by 1982.

Because U.S. refineries are at full capacity and because there is no real wholesale competition, each penny of tariff or import fee allows the U.S. wholesale price to go up at least a penny and transfer a billion dollars from consumers to refiners.

The refiners are hoping that a tariff such as the one proposed in S. 2012 will allow them to pass the Crude Equalization Tax on to the consumers and maintain current profit margins. Any member of Congress who votes for a tariff is voting for a sharp increase in the retail price of gasoline, perhaps as high as 12 cents a gallon.

We strongly oppose S. 2012 and ask that before you believe the poverty pleas of the refiners you should demand to see their books.

At a recent hearing before the FEA, major refiners said they had no way of separating the profitability of refining and marketing. They are presently resisting the efforts of FEA to set up serious systems of vertical accountability.

If a welfare applicant came to HEW, he would be asked to produce more information on his net financial position than these oil companies have disclosed as they have asked this Committee and the FEA for "funds", "biases" and "tariffs".

This Committee has set ever tighter standards for welfare eligibility. We want tight welfare standards to apply to oil companies as well as people.

This Committee should remove the present 1½ cent import fee on products. Removal would lower product prices by a like amount and would save the consumers $1½ billion a year. The fee is not keeping out imports nor is it protecting us from foreign dependence. It is enriching refiners.

C. Product imports are desirable

Despite "Project Independence", America is importing 50 percent of its crude oil. Most of that comes from OPEC member countries. That crude can be cut off by turning a valve. It will remain in the ground and the well can be reopened at any time.

America presently imports about 2 percent of its refined product. Most of that comes from non-OPEC sources which are less vulnerable than we are to supply cut off. Even if product imports were freely allowed no more than 5 percent of U.S. demand would ever come from foreign sources because at the 5 percent level U.S. refiners would compete seriously.

Refiners cannot be shut down without enormous cost and loss. When they are not used they deteriorate rapidly. World refinery capacity is now almost twice projected demand and new refineries are coming on stream regularly. Competition is rigorous and healthy. In short, a product embargo is highly unlikely because it would cost the foreign refiners a fortune, leave them with ruined refineries and eliminate their competitive viability.

We need the imported product badly. FEA says that by late next year there will be a shortage of gasoline. The shortage will be temporary because smaller cars coming on stream will decrease demand. If American refiners all want to work tomorrow, they could not meet the shortage because it takes three years to build a refinery. The new refineries would arrive in time to sit idle.

It is dumb to use tax policy to encourage wasteful refinery construction. We are much better off using imports to cover the short run needs.

SUMMARY

We favor the Crude Oil Equalization Tax.
We oppose S. 2012 and all other product tariff measures.
We urge the repeal of product import fees.

UNITED STATES LEAGUE OF SAVINGS ASSOCIATIONS,
Washington, D.C., August 10, 1977.

Hon. RUSSELL B. LONG,
Chairman, Senate Committee on Finance,
Dirksen Senate Office Bulding, Washington, D.C.

DEAR MR. CHAIRMAN: On behalf of the United States League of Savings Associations, we ask that this letter be included in the hearing record of your Committee regarding tax aspects of the Comprehensive National Energy Policy, S. 1472.

The U.S. League and its 4,400 member savings and loan associations nationwide are particularly interested in those portions of the Comprehensive National Energy Policy, S. 1472, which provide tax incentives for energy conservation and retrofit projects in residential dwellings (Part A, Section 1101). We shall restrict our comments to that section of this bill.

Savings and loan associations have an important stake in America's housing inventory. As specialized lending institutions devoted primarily to home finance, our members are acutely aware of rapidly increasing energy costs and their impact on homeowners and homeownership. We are vitally interested in exploring ways to reduce energy waste, and we continue to pledge our cooperation and support in this regard. In response to President Carter's invitation to the public for comment, we wrote the Honorable James Schlesinger on April 7, 1977, and included the following recommendation:

"The IRS Code should be amended to provide direct Federal income tax credits to homeowners who improve the energy efficiency of their homes and install energy saving equipment or systems . . ."

We were pleased to find such provisions contained in Part A, Section 1101 of the Comprehensive National Energy Policy, since it has been the consistent position of our organization in recent years that one necessary tool in the struggle to conserve residential usage of energy is such a system of tax incentives. (We supported, for example, the limited tax credit developed by the House Ways and Means Committee as part of H.R. 6860 in the last Congress.)

The U.S. League endorses the system of tax credits contained in Part A, Section 1101 of this bill, which is designed to promote voluntary residential energy conservation by encouraging weatherization projects and installation of solar energy units. These credits will provide an immediate incentive to taxpayers to make the necessary energy conservation changes with minimal bureaucratic involvement and oversight while preserving the homeowner's freedom of choice on materials, methods of installation, etc.

Low-income persons (non-taxpaying) and modest income families are provided for through weatherization grants and other home improvement incentives under the President's broader energy plan contained in S. 1472's companion bill, S. 1469, and House-approved H.R. 8444. President Carter properly recognized that different income strata in the population require different incentives if his energy-saving goal is to be reached for residential properties. We would hope that your Committee and the Congress will retain this balanced approach.

As introduced, the tax incentives for "weatherization" improvements would not extend to most rental properties. We suggest that your Committee consider extending this benefit to multi-family units, since owners can pass along increased utility costs to renters in many situations. Such is the prevailing opinion of experts who have conducted thermogram studies of residences in selected American cities. If their conclusions are accurate, then incentives to achieve greater thermal efficiency in properties of this type must not be ignored. We recognize, of course, that this suggestion would add to the "tax expenditures" or potential revenue loss of S. 1472; such a change must necessarily be structured so that it does not unduly impact on broader economic objectives. The language of the recently passed House version of the National Energy Act (H.R. 8444) would effectively achieve this end if given your endorsement.

However, we must express our concern that individual homeowners who utilize conventional home improvement loans from traditional lenders to finance qualified retrofit measures may engage in extensive "double dipping" by claiming one tax credit on their Federal income tax form for the interest paid on the loan as well as the second very generous and attractive tax credit that this bill will make available. The U.S. League suggests your Committee investigate this potential problem area and consider developing an integration of these two desirable tax policies.

Mr. Chairman, we commend you and your Committee in your efforts to shape an effective tax incentive program as part of the Comprehensive National Energy Policy of 1977. The U.S. League praises President Carter for his bold program to alert our nation to the consequences of energy waste, and his legislative package to assure adequate energy resources for this and future generations of Americans. We know that your Committee and the Congress will continue to improve upon that beginning. Be assured of our full cooperation in this and all matters.

Sincerely,

JOHN A. HARDIN,
President.

ARTHUR B. EDGEWORTH,
Director, Washington Operations.

LONG BEACH AREA CHAMBER OF COMMERCE

RESOLUTION

NATIONAL ENERGY PROGRAM

WHEREAS, the Long Beach Area Chamber of Commerce is disappointed by the President's unfair criticism of the oil and gas industry; and

WHEREAS, we certainly share his concern over the energy situation and the urgent need for action; and

WHEREAS, together with the Congress and other groups in this country, we continue to have significant concern for the basic imbalance of the President's program, because of its heavy emphasis on taxes and almost total disregard for domestic oil and gas; and

WHEREAS, much more oil and gas can be found in the United States and much more oil can be recovered from existing fields; and

WHEREAS, it is absolutely imperative to maximize domestic oil and gas supplies during the next ten to fifteen years as we develop alternate energy sources; and

WHEREAS, a program is needed which stresses both domestic energy development and energy conservation to reduce our rapidly accelerating dependence on foreign oil.

NOW, THEREFORE, be it resolved that the Long Beach Area Chamber of Commerce urges the federal, state and local governments, together with oil and gas producing industry, to embark cooperatively in a bipartisan endeavor to: accomplish deregulation of new natural gas prices; adopt a policy of free market pricing of crude oil; increase emphasis on conservation of energy; establish a realistic environmental protection policy; assure cooperation among all governments in the exploration, production, transportation and storage of petroleum; and encourage the development of alternate energy resources to supplement finite supplies of oil and gas reserves.

BE IT FURTHER RESOLVED, that the Long Beach Area Chamber of Commerce recommends to the President and the Congress that the national energy policy currently under development should include the following concepts:

1. The price of new natural gas at the wellhead should be deregulated, as well as that of other gas, as existing contracts expire. This will achieve a phased deregulation of gas prices and permit such prices to rise to levels necessary to encourage maximum production from existing fields and promote exploration for new reserves from reservoirs which are deeper, marginal, or more difficult to explore and produce. Deregulation will also serve to restrict the artificial demand and wasteful uses of natural gas which have resulted in the past from a federally mandated pricing structure well below its replacement cost or the British Thermal Unit (BTU) equivalent of competing energy sources. In any event an exemption should be created for oil and gas wells which are now being prematurely abandoned when cost of production exceeds value of oil and gas production.

2. The decontrol of oil prices must be achieved at the earliest practical time, which should be not later than June 1979, as provided for in the Energy Policy and Conservation Act (EPCA) of 1975. Attention must be given to the fact that controlled prices established under EPCA have not kept pace with the continuing inflation in cost, and price levels of the economy, with the result that oil prices, in terms of constant dollars, are continuing to decline against substantially increasing costs of exploration and development.

3. This Chamber expresses its objection to any federal tax program applicable to domestic oil and natural gas which offers no incentive to increase production or conservation of the nation's mineral reserves and which will therefore result in a continuing waste of potential production and a reliance on foreign imports. The President and the Congress are urged to take steps to assure that any higher prices paid by the consumer will serve to increase the domestic supply of oil and gas and avoid the waste of the domestic reserves which would not otherwise be recovered and made available to the American public.

4. Increased emphasis on conservation in the use of energy, coupled with realistic environmental protection policies, must be established by the federal government in cooperation with the various states, to permit maximum benefits from available sources of energy as well as to assure acceleration of exploration for and development of the nation's energy resources.

5. The great reserves of Alaskan oil and gas, including the SOHIO project, must be made available to all the Lower 48 states at the earliest possible time by the conclusion of the decision-making process for the route transportation and by the construction of appropriate transportation and storage facilities.

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