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LOAN GUARANTEE PROVISION, H.R. 3474

GOVERNMENT

Storage

**ERDA AUTHORIZATION BILL,
FISCAL YEAR 1976**

HEARINGS

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**HEARINGS
BEFORE THE
COMMITTEE ON
SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
NINETY-FOURTH CONGRESS
FIRST SESSION**

SEPTEMBER 18, 25, AND OCTOBER 30, 1975

[No. 40]

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LOAN GUARANTEE PROVISION, H.R. 3474, ERDA
AUTHORIZATION BILL, FISCAL YEAR 1976

THURSDAY, SEPTEMBER 18, 1975

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, D.C.

The committee met, pursuant to notice, at 8 a.m., in room 2318, Rayburn House Office Building, Hon. Olin E. Teague, chairman of the committee, presiding.

The CHAIRMAN. The committee will come to order.

I would suspect that everybody here knows that the House has passed an authorization bill for ERDA and the Senate has, and that there are a number of differences between the two. The one that has attracted the most attention seems to be the loan guarantee provision in the Senate bill.

In the discussion at a meeting of our conferees on the House side it was obvious that there were many questions in the minds of the conferees. Because of that discussion at that meeting, this meeting was called, hoping that by this time we could have a definite answer from the administration as to their position. The administration does not have a definite position, but they have promised me that by next Tuesday they will have a definite position.

There will be no votes this morning, but we will recognize positions. When this meeting is over there will be another meeting of the conferees, and at that meeting the conferees will decide what else they are going to do; and, from having talked to a number of them, my guess is that they will want to have further hearings on this provision, and if that is the wish of the conferees, that's what we will do. I would hope we could hold them as soon as possible and get through with this thing. We've been working on it for a long time. It's been difficult on both sides. A lot of things hadn't been known in ERDA before, a lot of things we didn't know, and the Senate was late in confirming the Administrator of ERDA, and naturally that delay committed a hardship on him. But the meeting this morning is just for general discussion, in hoping that we might shed further light on this controversial subject.

Our first witness this morning will be Robert Fri, to whom we have submitted eight questions. Each member of the committee has a copy of those questions. Some of them Mr. Fri can discuss openly and fully. On others, he is rather restricted because the administration has not made a complete decision, and Mr. Fri has been told that he can be the

judge of which questions he feels that he can discuss and which ones he can't.

Mr. Hechler, do you have any comment?

Mr. HECHLER. Mr. Chairman, I would just like to put into the record the letter that I wrote to all members of the committee concerning this provision that we have before us.

The CHAIRMAN. Without objection, it will be included in the record.
[Mr. Hechler's letter follows:]

CONGRESS OF THE UNITED STATES,
HOUSE OF REPRESENTATIVES,
Washington, D.C., September 17, 1975.

Sent to all members of committee.

I am very pleased that Chairman Teague has scheduled a full committee meeting for 8:00 A.M., Thursday, September 18, to consider the loan guarantee provisions added by the Senate to the House-passed ERDA Authorization Bill. The purpose of this letter is to indicate that I have been receiving some strong outside pressure, as a House conferee, to commit my vote in favor of the loan guarantee provisions written into the bill by the Senate.

The Senate-passed provision which the House conferees are being asked to accept provides for up to \$6 billion of Federally-guaranteed loans of up to 75 percent of costs, for industry to build and operate synthetic fuels plants. Up to \$2.5 billion of this amount is earmarked for High-BTU coal gasification plants.

Here are some issues which I feel must be raised before we rush to judgment on accepting the \$6 billion Senate provision:

1. If the House conferees accept the Senate provision, this means that the \$6 billion item can neither be perfected nor amended in any way when it emerges from the conference committee. Only the conferees can write the language, and there will be no opportunity for direct input by Members of the Science and Technology Committee other than conferees, nor will other House Members have a chance to perfect the product of the conference.

2. Procedurally, the Senate provision was adopted without hearings, with very little debate on the floor. The September 18 committee meeting allows a status report by the Administration, yet there is no opportunity for airing the issue in hearings which will enable the committee to recommend the best safeguards in such a massive Federal commitment.

3. Prior to the raising of this issue, the Fossil Fuels Subcommittee which I chair scheduled hearings on the loan guarantee and incentives issue for October 20, 21, and 22, insofar as incentives relate to synthetic fuels. I have agreed to allow Rep. Ray Thornton, an announced supporter of the loan guarantee concept, to plan, develop and preside over these hearings. These hearings are scheduled for the earliest possible date in line with other subcommittee and committee business. Legislation along the lines of the Senate proposal or modifications thereof would thus be thoroughly examined and enable full committee consideration, in an orderly fashion.

4. ERDA has written me the attached letter, dated September 9, which supports the objective of the loan guarantee idea, yet raises a number of questions. ERDA says in the letter "there are several serious problems with" it. ERDA states this provision "should not" cover renewable energy sources.

5. I'm not really sure about this point, but I believe our committee ought to examine more thoroughly the size of the corporations which will be receiving loan guarantees. From the way the language is now drafted, interested companies in the oil shale area will include Occidental Oil, Union Oil, the Colony group (which includes ARCO, Ashland Oil, Shell Oil) and the Paraho group (which includes Exxon). I would like to see some careful examination of this proposal to insure that it really will open up the availability of capital to smaller companies. Frankly, I don't entirely trust the Administration testimony on the benefits accruing to large corporations vs. small companies. I am concerned that only the Administration will be allowed to speak and testify on this critical issue,

since the track record of the Administration has demonstrated greater concern for larger companies.

6. There are some substantive questions which have been raised within the Administration about the approach taken in the Senate amendment. It seems to me that these substantive questions ought to be raised either in hearings, or in allowing something more than an OMB-enforced "position" to be expressed to our committee.

For example, more than three months ago, an Administration task force headed by OMB completed a study of "alternatives for implementing" the President's goal announced last January of producing an equivalent of one million barrels per day of synthetic fuels by 1985 from coal and oil shale. The report of that study was sent to the Energy Resource Council on July 11, 1975. Last August I asked ERDA when it would be released and was told on September 9 that it will be available to Congress "in the near future"—whatever that means.

I understand, however, that volume 2 of that report concludes that a synthetic fuels commercialization program at the one million barrel per day level in the Senate amendment "cannot be justified at this time" and that 350,000 barrel per day level recommended by this Task Force will result in an "expected net loss of \$1.6 billion" in discounted 1975 dollars. This means that the costs of the program are expected to exceed its benefits. The report adds that there is a 10 percent chance that this program could result in "more than a \$7 billion net benefit or "more than a \$9 billion cost." (Take your choice.)

Reportedly, the Task Force is not recommending a loan guarantee program for all synthetic fuels.

For oil shale it recommends a combination of a Federally-guaranteed non-recourse loan for up to 50 percent of the construction cost, plus a competitively bid price support.

For regulated utility/industrial fuels (i.e., low Btu gas), a competitively bid construction grant is recommended.

For high Btu gas from coal, a competitively awarded non-recourse loan guarantee for up to 75 percent of the project cost, pending changes in the Natural Gas Act to bring synthetic gas under FPC jurisdiction or complete deregulation of natural gas.

The ERDA letter to me does not mention these variations in financial incentives.

I am troubled whenever a lot of lobbyists start to pressure me to rush through a multi-billion-dollar proposal without hearings or debate. What's wrong with trying to poke this pig and find out whether he really is a pig-in-the-poke or how much pork chops, ham and bacon are really there?

Sincerely,

KEN HECHLER.

Mr. HECHLER. In addition to that, I'd like to have put into the record the communication from the committee of 10 Western Governors.

The CHAIRMAN. Ken, we have statements from about 20 different organizations.

Mr. HECHLER. It probably is part of the record.

The CHAIRMAN. Including the statement from the Governors, including Governor Lamm, we have quite a few statements in there. I don't think the staff has had time to completely analyze them. So all we have is a "Yes" or a "No."

What do we have now? About 12 positions?

It's about 13; 8 to 5 against the provision, without hearings.

I would ask that without objection all those statements be placed in the record, and I will read later whom they come from.

We tried to break it down into groups; we knew some would be for and we knew some would be against, and we didn't try to—frankly, I sure didn't know how it was going to come out, but it turned out to be about 8 to 5 against the loan feature, without hearings.

[The statements referred to are as follows:]

COMMITTEE ON SCIENCE AND TECHNOLOGY,
U.S. HOUSE OF REPRESENTATIVES,
Washington, D.C., September 17, 1975.

MEMORANDUM

To: Members and staff of the House Committee on Science and Technology.
From: Staff.

Subject: Written statements submitted for Thursday's briefing.

Pursuant to Chairman Teague's instructions of Monday, September 15, 1975, the following parties were contacted regarding providing written statements for the briefing on Thursday, September 18, 1975.

The following will provide written statements:

Cameron Engineering (Russ Cameron)
Sierra Club
Environmental Defense Fund
Environmental Policy Center
The State of Colorado (Gov. Lamm)
Public Interest Research Group (Ralph Nader)
Exxon
Federal Energy Administration
Institute of Gas Technology
American Petroleum Institute
American Gas Association
Kellogg Construction Company
Koppers Corporation
The Oil Shale Company
Union Oil Company
Gary Western Refining Company
Dr. John S. Gilmore (Denver Research Institute)
Wheelabrator-Frye
Standard Oil Company of California
Dow
Texas Eastern

The following stated that they will try to prepare something for the committee:

Natural Resources Defense Counsel
Consumer Federation of America
ARCO

The following will not submit a written statement:

Donald Finn
Magma-Power Company
Environmental Protection Agency

An attempt to contact Mr. Donald Finn was not successful.

For further information, please contact Lee Wallace, ext. 59117.

COMMITTEE ON SCIENCE AND TECHNOLOGY,
U.S. HOUSE OF REPRESENTATIVES,
Washington, D.C., September 16, 1975.

MEMORANDUM

To: All members of the Committee on Science and Technology.

From: Chairman Olin E. Teague.

Subject: Loan Guarantee Provision H.R. 3474, ERDA Authorization Bill, fiscal year 1976.

My memorandum of September 12, 1975 announced a full committee meeting on the ERDA Authorization Bill, now in conference, for 8:00 a.m., Thursday, September 18, 1975, Room 2318 RHOB.

Attached are copies of the loan guarantee provision added by the Senate to H.R. 3474, together with an explanation of the provision and other supporting material from the Senate legislative report.

Enclosures.

SEC. 103. LOAN GUARANTEE PROGRAM FOR SYNTHETIC FUELS.—(a) It is the purpose of this section to—

(1) assure adequate Federal support to foster a joint government and industry demonstration program capable by 1985 of producing synthetic fuels from coal and oil shale equivalent to at least one million barrels of oil per day, and to assure adequate financial support to those enterprises seeking to employ renewable energy sources to generate power or heat on a commercial scale;

(2) authorize loan guarantees for the construction and operation of commercial facilities for the conversion of domestic coal and oil shale into synthetic fuels and for the construction and operation of facilities deriving energy from renewable sources; and

(3) further the national energy policies enunciated in the Federal Non-nuclear Energy Research and Development Act of 1974 (88 Stat. 1878; 42 U.S.C. 5901 et seq.).

(b) (1) The Administrator is authorized, in accordance with the provisions of this section, section 7 of the Federal Nonnuclear Energy Research and Development Act of 1974 (88 Stat. 1878; 42 U.S.C. 5901 et seq.), and such rules and regulations as he shall prescribe, and after consultation with the Secretary of the Treasury, to guarantee and to make commitments to guarantee the payment of interest on, and the principal balance of, bonds, debentures, notes, and other obligations issued by or on behalf of any person for the purpose of financing the construction and operation of (A) commercial facilities for the conversion of domestic coal and oil shale into synthetic fuels, including but not limited to, such synthetic fuels from coal as high-Btu gaseous fuels compatible for mixture and transportation with natural gas by pipeline, low-Btu gaseous fuels suitable for boiler use in compliance with applicable environmental requirements, liquid fuels for transportation uses, and petrochemicals; and (B) facilities to generate power or heat in commercial quantities utilizing as their energy source direct solar, wind, ocean thermal gradient, bioconversion, or geothermal resources: Provided, That the outstanding indebtedness guaranteed under this section at no time shall exceed \$6,000,000,000: Provided, further, That up to \$2,500,000,000 of guarantees shall be available for projects to produce high-Btu gaseous fuel compatible for mixture and transportation with natural gas by pipeline.

(2) An applicant for a loan guarantee under this section shall provide evidence in writing to the Administrator in such form and with such content and other submissions as the Administrator deems necessary to reasonably protect the interests of the United States. Each guarantee and commitment of guarantee shall be extended in such form, under such terms and conditions, and pursuant to such regulations as the Administrator deems appropriate.

(3) The Administrator is authorized to approve any modification of any provision of a guarantee or a commitment to guarantee such an obligation, including the rate of interest, time of payment of interest or principal, security, or any other terms or conditions, upon a finding by the Administrator that such modification is equitable, not prejudicial to the interests of the United States, and has been consented to by the holder of such obligation.

(c) The Administrator shall guarantee or make a commitment to guarantee under subsection (b) only if—

(1) the Administrator is satisfied that competition among private entities for the construction or operation of the system or component to be assisted under this section will be in no way limited or precluded;

(2) the Secretary of the Treasury and the Administrator are satisfied that the financial assistance applied for is necessary to encourage financial participation by private lenders or investors;

(3) the amount guaranteed does not exceed 75 per centum of the total project cost of the facility assisted provided that during the period of construction the guaranteed amount may exceed 75 per centum of such project costs until the construction of the facility is completed as determined by the Administration;

(4) the Administrator has determined that there will be a continued reasonable assurance of full repayment.

(d) No guarantee or commitment to guarantee an obligation entered into by the Administrator pursuant to this section shall be terminated, canceled, or otherwise revoked, except in accordance with reasonable terms and conditions prescribed by the Administrator. Such a guarantee or commitment to guarantee shall be conclusive evidence that the underlying obligation is in compliance with

the provisions of this section and that such obligation has been approved and is legal as to principal, interest, and other terms. Such a guarantee or commitment shall be valid and incontestable in the hands of a holder as of the date when the Administrator entered into the contract of guarantee or commitment to guarantee, except as to fraud, duress, mutual mistake of fact, or material misrepresentation by or involving such holder.

(e) (1) If there is a default by the obligor in any payment of interest or principal due under an obligation guaranteed by the Administrator under this section and such default has continued for sixty days, the holder of such obligation or his agents have the right to demand payment of such unpaid amount from the Administrator. Within such period as may be specified in the guarantee or related agreements, but not later than forty-five days from the date of such demand, the Administrator shall promptly pay to the obligee or his agent the unpaid interest on and unpaid principal of the obligation guaranteed by the Administrator as to which the obligor has defaulted, unless the Administrator finds that there was no default by the obligor in the payment of interest or principal or that such default has been remedied.

(2) If the Administrator makes a payment under paragraph (1) of this subsection, he shall have all rights specified in the guarantee or related agreements with respect to any security which he held with respect to the guarantee of such obligation, including, but not limited to, the authority to complete, maintain, operate, lease, sell, or otherwise dispose of any property acquired pursuant to such guarantee or related agreements.

(3) If there is a default under any guarantee or commitment to guarantee an obligation, the Administrator shall notify the Attorney General. Upon such notification, the Attorney General shall take such action against the obligor or any other parties liable thereunder as is, in his discretion, necessary to protect the interests of the United States. The holder of such obligation shall make available to the United States all records and evidence necessary to prosecute any such suit.

(f) (1) The Administrator is directed to submit a report to the Congress within ninety days of enactment of this section setting forth his recommendations on the best opportunities to implement a program of Federal financial assistance with the objective of demonstrating production of the equivalent of one million barrels of oil per day by synthetic fuels processes by 1985 utilizing the authority set forth in this section and other forms of Federal assistance provided for in the Federal Nonnuclear Energy Research and Development Act of 1974 (88 Stat. 1878; 42 U.S.C. 5901 et seq.).

(2) The Administrator is directed to submit a full and complete report on each proposed guarantee or commitment to guarantee pursuant to this section to the appropriate committees of the Congress and such guarantee or commitment to guarantee shall not be finalized under the authority granted by this section prior to the expiration of ninety calendar days (not including any day on which either House of the Congress is not in session because of an adjournment of more than three calendar days to a day certain) from the date on which the Administrator's report on the proposed guarantee or commitment to guarantee is received by the Congress.

(g) There is hereby authorized such funds as necessary to carry out the purposes of this section.

D. LOAN GUARANTEES

The Committee recognizes that the Congress' immediate concerns should be Federal programs to cope with our country's economic problems such as the recession, inflation, and unemployment. It is the judgment of the Committee, however, that this period also must be used to implement national programs to improve our country's energy posture over the long-term. The groundwork must be laid at this time for the enormous, sustained energy programs necessary to assure sufficient domestic energy supplies to maintain a strong economy, once our present economic problems are brought under control.

In creating the Energy Research and Development Administration last year and enacting the Federal Non-Nuclear Energy Research and Development Policy Act, the Congress intended to launch a comprehensive Federal energy research, development, and demonstration program to provide and create new energy choices for the United States in the future. In this regard perhaps the most significant energy supply need of the United States is the development of alternative fuel sources to domestic natural gas and oil. In the Committee's judgment it is not enough to speak of research on new energy technologies; time

schedules also must be established for the commercial demonstration of synthetic fuels and other non-conventional energy supplies.

The need for a Federal synthetic fuels program was enunciated by President Ford in his 1975 State of the Union message. At the time the Chief Executive proposed a National Synthetic Fuels Commercialization Program capable by 1985 of producing 1 million barrels of synthetic fuels and shale oil per day. Subsequently, in February, 1975, Senator Pastore's Ad Hoc Committee to the Senate Democratic Conference recommended in the Congressional Program of Economic Recovery and Energy Sufficiency that "a commercial demonstration of new synthetic fuels from coal should be undertaken with an ultimate production goal (by 1985) reaching the equivalent of 500,000 barrels of oil per day."

In order to achieve this Congressional and Administration endorsed objective, on July 8, 1975, Senator Jennings Randolph (D-W.Va.) introduced S. 2066, the Synthetic Fuels Act of 1975; this measure was cosponsored by Senator Henry M. Jackson (D-Wash.). At the time Senator Randolph characterized the bill as "the single most important action that can be taken by the Federal government to expedite the commercial development of a domestic synthetic fuels industry."

Subsequently, during the Committee's consideration of S. 598 on July 22, 1975, Senator Jackson offered as an amendment and the Committee approved with amendments the provisions of S. 2666 as Section 103 of S. 598. As adopted section 103 provides the Administrator of the Energy Research and Development Administration with authority to guarantee loans for the commercial demonstration of synthetic fuels. The purposes of this section are to—

Assure adequate Federal support to foster a joint government and industry demonstration program capable in 1985 of producing synthetic fuels from coal and oil shale equivalent to at least one million barrels of oil per day, and to assure adequate financial support to those enterprises seeking to employ renewable energy sources to generate power or heat on a commercial scale; and

Further the national energy policies enunciated in the Federal Non Nuclear Energy Research and Development Act of 1974.

In order to accomplish these purposes, the measure authorizes the ERDA Administrator to guarantee and to make commitments to guarantee the payment of interest on, and the principal balance of, bonds, debentures, notes, and other obligations issued by or on behalf of any person for the purpose of financing the construction and operation of—

Commercial facilities for the conversion of domestic coal and oil shale into synthetic fuels, including but not limited to, such synthetic fuels from coal as high-Btu gaseous fuels compatible for mixture and transportation with natural gas by pipeline, low-Btu gaseous fuels suitable for boiler use in compliance with applicable environmental requirements, liquid fuels for transportation uses, and petrochemicals; and

Facilities to generate power or heat in commercial quantities utilizing as their energy source direct solar, wind, ocean thermal gradient, bioconversion, or geothermal resources.

The total outstanding indebtedness that may be guaranteed, at any time, by the Administrator is limited to \$6 billion. However, the Committee intends that the Administrator give the highest priority to the gasification of coal to produce high-Btu gaseous fuels compatible for mixture and transportation with natural gas by pipeline. For this purpose the Committee ear-marked \$2.5 billion of guarantees.

Individual project guarantees are not to exceed 75 percent of the project cost for the facility; however, at any time during the period of actual construction of the facility the Administrator may guarantee in excess of 75 percent; up to 100 percent of the project cost until construction of the facility is completed, at which time the guarantee shall be restricted to a maximum of 75 percent of the project cost.

The Committee recognizes that synthetic fuel projects can involve both mining and manufacturing facilities requiring extensive investment in resource assessment, resource acquisition, and development of necessary infrastructures and community facilities. Protection of the environment also can require costly environmental analysis and safeguards. Therefore, the Committee intends that the loan guarantee program be administered in a manner which recognizes the range of necessary investments to assure the project's viability consistent with applicable Federal and State environmental requirements. In this regard the

Committee intends that the Administrator exercise the authority contained in section 103 so as to permit the project's costs to include, as necessary to assure the project's economic viability, any costs incurred in the acquisition or construction of a facility and in the preparation of the facility for normal operation, including, but not limited to, the costs of acquisition or construction of the plant and equipment, the acquisition of the technology, the acquisition of raw material reserves, site development, environmental analysis and environmental protection measures, community planning and development, and interest during construction.

In exchange for the guarantee of loans by the Administrator pursuant to this section, the Committee intends that the persons receiving or benefiting from the guarantee pledge all assets of the project, including raw material reserves, plant, support facilities and technology rights to the Administrator so that, in the event of default, the Administrator would be in a position to operate, lease, or operate the project. This is intended to assure the Administrator the rights of a mortgagee and, if foreclosure should become necessary, the federal government would obtain title to a complete facility, including the reserves and technology necessary for operation.

In the interest of assuring Congressional oversight of this loan guarantee program the Administrator is required to submit to the Congress within 90 days of enactment of this section his recommendations on the best opportunities to implement a program of Federal financial assistance with the objectives of demonstrating production of the equivalent of 1 million barrels of oil per day by synthetic fuels processes by 1985 utilizing the authority in this program and other forms of financial assistance available to him pursuant to the Federal Non Nuclear Energy Research and Development Act of 1974.

In addition a report is to be submitted to the Congress on each proposed guarantee of commitment to guarantee a project pursuant to this program. Such proposal shall reside before the Congress subject to Congressional disapproval for 90 days before it may be finalized by the Administrator. At any time during this period the Administrator may withdraw his recommendation.

In the Committee's judgment, greater Federal incentives are needed to cut the Gordian Knot of economics for the first generation of pioneer synthetic fuels plants in this country. The market place does not now provide sufficient incentives or an adequate mechanism for encouragement of the establishment of this industry.

At the present time, our country does not possess an adequate infrastructure to support the expeditious design construction and management of a domestic synthetic fuels industry. Moreover, there is a need to verify, on a commercial scale, the economic value or cost-effectiveness of alternative processes particularly with respect to synthetic fuels production from a variety of domestic coal types. The Committee believes that if these objectives are to be achieved in a timely fashion the Federal government must encourage the private sector to commercialize first generation synthetic fuels technologies.

For example, technologies for the conversion of coal to gaseous (methane) or liquid (methanol) fuels are fully demonstrated. Extensive successful tests have been performed on coals from Illinois, North Dakota, Montana, and New Mexico. Large-scale applications and uses exist, or existed, in Germany, England, Australia, and South Africa. The basic technologies of gasification as well as the conversion of products to methanol is 50 years old and in wide-scale use in other parts of the world.

Several first generation technologies applicable to non-caking and mildly-caking United States' coals for the production of low-Btu gas, high-Btu gas, and methanol are now ready for commercialization in this country.

The Committee notes that the present research and development efforts of ERDA anticipate reducing synthetic gas prices by more than 10 percent but, significantly, not more than 15 percent. The Committee also observes, however, that under today's inflationary conditions this advantage would disappear in less than two years even should the second generation processes under consideration by ERDA should prove fully successful. In other words, a synthetic gaseous fuels plant built today with known technology will be competitive with a plant built in 3 or 4 years with technology now under development.

The principal constraint to deployment of these technologies at the present time is the availability of sufficient capital at reasonable interest rates. For

example, production by 1985 of synthetic gas equivalent to 1 million barrels of oil per day will require a total capital investment over the next 5 to 7 years of about \$20 billion. While this appears monumental by comparison it represents less than 10 percent of the planned investment in new electric power generation over the same period and is thus realistic.

While it is often perceived that synthetic fuels are expensive this is not necessarily the case. For example, although synthetic substitutes for natural gas from coal are expensive their costs nevertheless compare very favorably with electric power generation from coal, which is accepted as a matter of course. The cost of electricity from coal varies from \$8 to \$10 million Btu's, while methane from coal costs about \$3 to \$4 per million Btu's.

For comparable capital investments the conversion of coal to methane is cheaper in first cost, more efficient, and produces much lower cost energy supply which also is cheaper to distribute than electricity. In summary the gasification of coal is competitive with electrification for the delivery of clean energy from a domestic source for commercial and residential use.

On the other hand synthetic liquid fuels are not now competitive with conventional supplies. Moreover, the state of this art is now essentially in the pilot plant stage ready for semi-commercial scale demonstration.

Compared to conventional oil exploration, production, and refining, the required capital investment for a coal mine and a synthetic fuels plant to produce comparable products is about one-half as much.

During this period when our country is faced with the dual problems of severe capital limitations and a shortage of environmentally acceptable fuels, a case can certainly be made for encouraging synthetics.

First generation technology for the production of synthetic fuel from oil shale has reached the stage where construction of the first commercial scale facilities is warranted. Four oil shale production processes have been tested at the pilot plant stage which appear to offer promise for commercial-size demonstration.

Evidence suggests that if the Nation relies solely on private enterprise to construct commercial oil shale plants in the normal course of business, industry spokesmen believe that the first experimental plants will not get underway before 1979 or 1980; and significant shale oil production could not be expected before 1995. The Federal Government, however, can expedite oil shale development and prove or disprove the viability of this resource before 1980 by means of guaranteed loans. Further, government loan guarantees would enable independent oil producing companies as well as consumers of oil (including farm cooperatives) to participate in oil shale ventures.

A Federal loan guarantee program will permit prospective oil shale producers to overcome the present impasse resulting from the virtual unavailability of venture capital for oil shale commercialization. With the private participants being required to bear at least the first 25 percent of project investment risk, there will be an incentive to assure that the plants are built and operated in an efficient manner.

With regard to renewable energy sources, the Committee observes that uncertainty in government policies and the generally tight credit situation also make it difficult to obtain financing for commercial-scale development projects in such alternative energy areas as solar and geothermal. While specific authority to guarantee loans was provided under the Geothermal Energy Research and Development Act of 1974, in the Committee's judgment the limit of \$25 million provided for by that law appears inadequate. In the solar area, advanced designs for solar thermal powerplants, solar stills for desalination, and commercial-scale wind generators are nearing the demonstration stage. Further in the future, ocean thermal gradient systems are now in the conceptual design phase. However, loan guarantees are not available for the demonstration of solar energy under existing law.

The Committee intends that the Administrator exercise discretion in determining the appropriate point in the development cycle of such energy technologies as direct solar, wind, ocean thermal gradient, bioconversion (energy recovery from renewable organic material), and geothermal resources where loan guarantees would aid in their demonstration or commercialization.

In authorizing loan guarantees the Committee intends that the ERDA Administrator launch a Federal program to assure a limited number of plants are constructed to prove the technical and economic feasibility of commercial

production of synthetic fuels. In the Committee's judgment this must be undertaken recognizing that any major reliance on synthetic energy supplies will require enormous capital investments and manpower. Because of the higher prices that will be associated with synthetic fuels the cost must be clearly delineated in advance. Nevertheless, the Committee believes that it is essential that the United States possess in 1985 an established synthetic fuels industry.

COMMITTEE ON SCIENCE AND TECHNOLOGY,
U.S. HOUSE OF REPRESENTATIVES,
Washington, D.C., September 12, 1975.

Dr. ROBERT C. SEAMANS, JR.,
*Administrator,
Energy Research and Development Administration,
Washington, D.C.*

DEAR DR. SEAMANS: As you know, our Committee is presently preparing for a conference on the ERDA Authorization Bill for 1976 and the transition period. One of the provisions added by the Senate is a loan guaranty program which is far reaching in its scope. In view of its importance, I have scheduled a meeting of our full Committee for 8:00 a.m. on Thursday, September 18, 1975 in Room 2318 of the Rayburn House Office Building.

It would be most helpful to the Committee if you could attend our meeting to brief the Committee on the Administration's position on the provision. I note that your September 9 letter to Congressman Ken Hechler States that ERDA "supports the objective" of the loan guaranty provision but that "there are several serious problems" with that provision. Because of our interest in the effects of this provision I am also asking representatives of the Treasury Department, the Office of Management and Budget, and the Congressional Budget Office to appear with you.

I have enclosed, and would appreciate you being prepared to respond to, the following questions on September 18.

Thank you very much for your attention to my request.

Sincerely,

OLIN E. TEAGUE,
Chairman.

Enclosures.

COMMITTEE ON SCIENCE AND TECHNOLOGY,
U.S. HOUSE OF REPRESENTATIVES,
Washington, D.C., September 12, 1975.

Hon. WILLIAM E. SIMON,
*Secretary of Treasury,
Fifteenth Street and Pennsylvania Avenue, N.W.,
Washington, D.C.*

DEAR MR. SECRETARY: The Committee on Science and Technology is presently preparing for a conference with the Senate on the ERDA Authorization Bill for 1976 and the transition period. One of the provisions added by the Senate is a loan guaranty program which is far reaching in its scope. In view of its importance, I have scheduled a meeting of our full Committee for 8:00 a.m. on Thursday, September 18, 1975 in Room 2318 of the Rayburn House Office Building.

It would be most helpful to the Committee if you could attend our meeting to brief the Committee on the Administration's position on the provision. Because of our interest in the effects of this provision, I am also asking representatives of the Office of Management and Budget, the Energy Research and Development Administration, and the Congressional Budget Office to appear with you.

I have enclosed, and would appreciate you being prepared to respond to, several questions that are in the minds of the Members as they review this provision.

Thank you very much for your attention to my request.

Sincerely,

OLIN E. TEAGUE,
Chairman.

Enclosures.

COMMITTEE ON SCIENCE AND TECHNOLOGY,
U.S. HOUSE OF REPRESENTATIVES,
Washington, D.C., September 12, 1975.

Mr. JAMES T. LYNN,
Director, Office of Management and Budget,
Executive Office Building, Washington, D.C.

DEAR MR. LYNN: The Committee on Science and Technology is presently preparing for a conference with the Senate on the ERDA Authorization Bill for 1976 and the transition period. One of the provisions added by the Senate is a loan guaranty program which is far reaching in its scope. In view of its importance, I have scheduled a meeting of our full Committee for 8:00 a.m. on Thursday, September 18, 1975 in Room 2318 of the Rayburn House Office Building.

It would be most helpful to the Committee if you could attend our meeting to brief the Committee on the Administration's position on the provision. Because of our interest in the effects of this provision, I am also asking representatives of the Energy Research and Development Administration, the Treasury Department, and the Congressional Budget Office to appear with you.

I have enclosed, and would appreciate you being prepared to respond to, several questions that are in the minds of the Members as they review this provision.

Thank you very much for your attention to my request.

Sincerely,

OLIN E. TEAGUE,
Chairman.

Enclosures.

STAFF QUESTIONS FOR WITNESSES RESPONSE

1. What, if any, analysis have been made of the capability of energy suppliers and/or users to construct demonstration facilities leading to the commercialization of synthetic fuels?

2. What, if any, effect will such loan guaranties have on the capital markets and other domestic energy alternatives which may be more economic?

3. Do you intend that loan guaranties be used solely for construction of "one-of-a-kind technology" commercial plants, but not for support facilities that may be required, such as schools, roads, and other public facilities?

4. How many facilities and of what size do you anticipate could be built with a \$6 billion program? Could you provide some estimate of how rapidly you anticipate the commitment of the guaranties?

5. In view of the technical, regulatory, environmental, and other problems associated with oil shale and high Btu gasification development, do you anticipate that you would receive and approve any application for a loan guaranty in fiscal year 1976?

6. The Senate provision would authorize loan guaranties to any applicant, including companies that have a good cash flow position but are reluctant to invest in such high risk facilities and companies that are owned or controlled by foreign entities. What are your views on whether such guaranties should be limited to lender of last resort situations and to U.S. citizens or nationals and corporations substantially controlled by U.S. citizens and nationals?

7. Should the loan guaranties be subject to the patent provisions (Sec. 9) of the Federal Nonnuclear Energy Research and Development Act of 1974 and the public information provisions (Sec. 107(e) of the Energy Reorganization Act of 1974?

8. Should the loan guaranty authority be available for demonstrations of any new energy technology, including those utilizing energy resources and those related to energy conservation?

9. Should the provision concerning recourse in case of default in section 103 (e) (3) of the Senate amendment be included in the authority for loan guaranties?

Hon. Olin Teague,
Chairman, House Committee on Science and Technology, 2311 Rayburn House
Office Building, Washington, D.C.

Hearings on mammoth federal construction loan guarantees (S. 598) are critically needed. We urge immediate scheduling of hearings when the committee on Science and Technology meets to consider this matter September 18.

Western States will be most affected by the \$6 billion program, but have had no opportunity to review, influence, or comment on said program. Any federal legislation which will so affect our economy, environment, energy supply and social framework requires adequate congressional hearings.

In Santa Fe, New Mexico on July 29, 1975, 10 Western Governors unanimously adopted a public policy resolution which requested (a) state review and input into federal synthetic fuels programs, (b) full information on the federal synthetic fuel programs, and (c) assurances that synthetic fuel development will be undertaken without adverse effects to western environment, economy and social integrity. Frank Zarb of FEA has acceded to these requests and has agreed to state input into the Administration's synthetic fuel program.

We believe that hearings on S. 598 should focus on numerous issues not addressed in any hearings or public discussion on this bill. Among these are:

(a) Projected socio-economic impact of the \$6 billion synthetic fuel development, and mitigation of this impact.

(b) Areas of state or federal jurisdiction as to land use, utility siting, taxation, and application of state standards on matters of air, water, and mine reclamation.

(c) Application of state or federal Environmental Policy Acts to projects whose financing is guaranteed under S. 598.

(d) The procedures for ongoing participation, approval and review of S. 598 projects by elements of federal, state, and local government.

In summary, we urge immediate hearings on S. 598 and its critical rider attached by Senator Jackson. To proceed in any other fashion would be a disservice to the states most directly affected by S. 598.

Paul H. Castro, Governor—Arizona; Richard D. Lamm, Governor—Colorado; Thomas L. Judge, Governor—Montana; J. James Exon, Governor—Nebraska; Jerry Apodaca, Governor—New Mexico; Arthur Link, Governor—North Dakota; Richard F. Kneip, Governor—South Dakota; Calvin L. Rampton, Governor—Utah; and Ed Herschler, Governor—Wyoming.

ENVIRONMENTAL POLICY CENTER,
Washington, D.C., September 17, 1975.

HON. OLIN E. TEAGUE,
Chairman, Science and Technology Committee, Rayburn House Office Building,
Washington, D.C.

DEAR CHAIRMAN TEAGUE: The Senate version of the Energy Research and Development Administration Authorization bill, HR. 3474, contains a \$6 billion provision which gives the Administrator of ERDA the authority to guarantee loans for the commercial demonstration of synthetic fuels processes. One of the purposes of the section is to assure adequate Federal support to foster a joint government and industry demonstration program capable of producing at least one million barrels of synthetic fuels from coal and oil shale. The provision is an attempt to create new energy choices for the United States by establishing commercial-size demonstration plants for the conversion of coal and shale into petroleum products. However, the scope of the program is enormous and the impact such a program might have on other sectors of the economy and upon the Federal Treasury have not been adequately addressed thus far.

In light of the huge amount of Treasury dollars that would be made available to the Administrator of ERDA and the importance of approaching a synthetic fuels demonstration program in a comprehensive manner, I strongly urge you to delay any action of that section of the Senate's version of the bill and begin a thorough examination of all aspects of such a program. The Senate's Loan Guarantees Program is the first step toward a National Synthetic Fuels Program and the public has not had an opportunity to provide a moment of testimony regarding such a far-reaching program.

I am aware that your Committee will be briefed by ERDA and other Administration officials regarding the loan guarantee amendment on Thursday morning. In addition to this briefing, you have requested written comment on the loan program provision from Environmental Policy Center and other environmental-consumer interest groups to be delivered to the Committee by September 18. Due to the magnitude of such comment on so many aspects of the loan program—environment, drain on Treasury, other subsidies needed by synfuel industry—I will not have an opportunity to supply you with the in-depth analysis your

request deserves. Your request for written comments within three days does not offer the public an opportunity to comment and raise the many serious questions about such a major Congressional action.

The Science and Technology Committee has labored long and hard to report a bill which represents careful thought and an appreciation of the multiple issues that a synthetic fuels industry raises. To accept the Senate's \$6 billion loan guarantees program without the benefit of extensive public hearings and debate beforehand would not be in keeping with the standards this Committee has exhibited in the past.

I have attached a list of several objections to the present language of the amendment which should be addressed in a public debate. Thank you for your attention in this matter.

Sincerely,

JOHN L. MCCORMICK.

ENVIRONMENTAL POLICY CENTER,
Washington, D.C.

Comments on Section 103, "Loan Guarantee Program For Synthetic Fuel" in S. 598.

The loan guarantee program's target of one million barrels of synthetic fuels per day is far in excess of the Administration's Task Force on Synthetic Fuels Commercialization recommendation of 350,000 barrels of synthetic fuels per day. The Task Force's summary states that based on environmental and cost/benefit analyses, a one million barrel per day synfuels commercialization program is not justifiable at this time. Therefore, the Senate's goal of one million barrels per day must be looked upon as unrealistic.

The program does not have any restrictions prohibiting foreign interests from qualifying and receiving a guaranteed loan to carry out the purposes of the loan program. In addition, the major oil and gas companies in the United States will have the advantage over smaller companies in securing loans because of the strong emphasis on the more expensive conversion processes such as oil shale and coal gasification and liquefaction.

While the intent of the program is to assist in the financing of demonstration plants, the purposes of the section relate to the "construction and operation of commercial facilities for the conversion of domestic coal and oil shale into synthetic fuels". It is unclear whether this limits the amount of research which can be undertaken to improve the technology to that which does not interfere with the commercial viability of the various plants. In that event, there is no real benefit to the public since a significant change in the operation of the plant, in the name of efficiency, could be challenged by the recipient of the loan as an impediment to the plant's commercial viability.

The labor demand for synthetic fuels plants, whether in the construction or the operational stage, is substantial and particularly in the rural Western states. The Senate Interior Committee Report states that reports on various applications for loans must include estimates of the costs of community planning and development related to the synfuel project. The concern for the social impacts associated with energy development projects in the rural West has become one of the most serious focal points in the debate on Western energy development. It warrants the attention of Federal agencies having expertise in new-community development such as H.U.D. The ERDA does not have such expertise although it is charged with the responsibility of reviewing and evaluating the plans designed to control the social impacts of the proposals.

The non-nuclear portion of the ERDA budget contains a large sum of tax dollars for the purpose of researching new and more efficient methods of converting coal and oil shale to petroleum products. Certain of these processes may offer a revolutionary change in our approach to synfuel plants. The money spent on these research projects may be wasted if the first generation plants are constructed, incorporating the present-day technology. There will not be any enthusiasm on the part of the Federal government to provide loan guarantees to second generation processes which incorporate an entirely new, more efficient method of conversion.

It appears that continued R&D on unproven synfuels processes funded by ERDA would be more cost beneficial than the Federal subsidies in the Loan Guarantee Program aimed at forced commercialization of the processes. High and low Btu coal gasification processes are in commercial operation elsewhere in the world and this technology is widely known. In certain synfuels processes

there are risky technologies which can be more easily researched and perfected without the massive expense of a commercial-size plant. Coal liquefaction is too costly and too far from the commercial stage and should remain in the R&D program.

There is a debate among those interested in developing a synfuels industry over the question of the proper and most beneficial government incentives to meet this goal. The loan guarantee approach is receiving most of the criticism because it has the potential for forcing out more economical projects because of the forced diversion of funds to the less economic projects of more influential companies. An example is the Arctic gas pipeline proposal which could possibly supply a greater and cheaper supply of natural gas to the Nation than gasification plants. If the gas industry were motivated toward gasification plants however, with the help of incentives, it is likely that the industry would commit most of its capital in that direction. In that event, private financing of the Alaska natural gas project would become more difficult and might require separate federal incentives of its own.

The approach the Synthetic Fuels Task Force has taken, in regard to incentives, is to recommend competitively bid price supports and changes in present regulations governing gas prices. With each of the synfuels processes, gasification-liquefaction-oil shale, requiring different incentives, as the task force has recommended, it is apparent that the singular approach, that being guaranteed loans, may not be the wisest choice.

ENVIRONMENTAL POLICY CENTER,
Washington, D.C., September 17, 1975.

To members of the Science and Technology Committee:

The Senate version of the ERDA Authorization bill contains a \$6 billion guaranteed loan program designed to foster a joint government and industry demonstration program capable of producing at least one million barrels of synthetic fuels from coal and oil shale. The Senate Interior and Insular Affairs Committee did not hold a moment of hearings on this provision despite the enormous sum of money that would be made available for the loan program. The Treasury Department has criticized the guaranteed loan approach as an incentive and has recommended other subsidies which might be more beneficial to the industry and to the economy.

I am aware that the Committee will be briefed by Administration officials on the merits of the provision and the public has been asked to submit written comments by Thursday of this week. However, I do not feel this constitutes sufficient public input and debate on such a massive program. The Senate's loan program represents a big first-step toward a synthetic fuels industry and the path we choose in getting such an industry off the ground may determine the ultimate success or failure of such an endeavor. For these reasons, I urge you to delay action on the Senate's guaranteed loan program (Sec. 103, S. 598) and begin an extensive analysis of the economic and other impacts this program might have on the Nation. While hearings have been held in the past on oil shale, coal gasification and liquefaction, etc., the Congress has not addressed the issue of subsidies for these technologies since the inter-agency Synthetic Fuels Commercialization Program Task Force made their recommendations on incentives in June.

The Science and Technology Committee has labored long and hard to report a bill which represents careful thought and an appreciation of the multiple issues that synthetic fuels entail. To accept the Senate's \$6 billion loan program intended to bring on line, coal gasification and oil shale plants would make the research expenditures in your version of the ERDA bill seem like an unnecessary expenditure once the commercial demonstration plants are operating.

I have included a letter to Chairman Teague and a list of objections to the loan guarantee program.

Sincerely,

JOHN L. McCORMICK.

TELEGRAM

To: Congressman Olin E. Teague.

Re: Position paper of Gary Operating Company regarding Senate Bill S. 598, presented to the House Committee on Science and Technology.

Gary Operating Company, a Denver based Rocky Mountain independent oil producer, natural gas processor, refiner, and participant in the Paraho oil shale

demonstration program, is vitally concerned with the orderly development of oil shale and has reviewed those portions of Senate Bill S. 598 dealing with the proposed loan guarantee program for synthetic fuels.

While Gary Operating Company recognizes and endorses the concept of Federal assistance toward the development of new energy resources, we strongly feel that the magnitude of the proposed loan guarantee program cannot be justified at this time for the following reasons:

The lack of definition within the bill could result in the construction of a very few, massive synthetic plants, such as 250 million cubic feet per day coal gasification projects or 50,000 barrels per day shale oil plants. Projects of this magnitude cannot now be justified by current technology.

In our opinion it is important to stress that any proposed synthetic fuel plant incorporates multiple process units of identical design and function. As an example, a 50,000 barrel per day shale oil complex would require the construction of from 7 to 10 identical above-ground retorts. To date, not one full size retort has even been constructed, let alone operated in such a way as to demonstrate reliability, costs and environmentally acceptable operation. Accordingly, we strongly urge that legislation be enacted which will encourage the construction of single modular demonstration size synthetic fuel plants capable of evaluating the relative merits of emerging first generation technologies.

In order to adequately assess comparative oil shale technologies, Gary Operating Company has engaged the Colorado School of Mines Research Institute to do an analysis of the present status of the existing technology in the shale industry. We are enclosing an outline of the proposed analysis for your reference. Upon completion of the study, prior to October 1, we will forward a copy to you. Should the committee require additional information or comments, we will be honored to reply.

Very truly yours,

TURNER C. SMITH,
Vice President, Gary Operating Co.

NOTE.—The outline referenced is available for review at room B-374, Rayburn House Office Building.

EXXON CORPORATION,
Washington, D.C.

Loans or loan guarantees will not induce investment in synthetic fuel projects unless energy prices for the prospective life of the project are perceived to be sufficiently high to make the project commercially attractive. When this happens the loans and guarantees will not be needed to induce investments.

Loan guarantees will have the effect of lowering interest rates on synthetic loans to lowest levels. While a low interest rate would be a plus for project economics, selection of guarantee candidates would invite arbitrary and anti-competitive procedures.

DAVID L. BAIRD, Jr.,
Associate Washington Representative.

The U.S. has an abundance of potential energy sources in its vast reserves of coal and shale. However, it will take many years and billions of dollars of investment before a viable synthetics industry emerges. In the meantime, direct coal use should be expanded to the practical maximum extent possible to displace oil and gas for other purposes.

Synthetics from coal and shale can begin to contribute to U.S. energy supplies in the mid to late 1980's. However, there are a number of barriers that must be resolved to permit substantial production of synthetics in the future. The development of synthetics will be slowed by many uncertainties. These uncertainties are economic and environmental as well as technological. The absence of firm federal government policies, the concern about environmental costs and regulations, the uncertainty over mining permits, land leasing, waste disposal problems, air quality standards, water availability and the increasing capital cost requirements have all contributed to the lack of synthetics development. Coupled with these uncertainties are the concern about future oil prices, inflation effects on profits, cash flow, other government regulations affecting capital formation, and taxes.

The technological problems can be solved, given time and incentives, but the economic and environmental climate must be clarified if a viable synthetic industry is to commence and grow.

Some of the specific constraints to synthetics development are expanded below:

Capital investment requirements are huge. Estimates for a plant starting up in 1985 range upward from \$750 million for 50,000 barrels per day oil equivalent output. The difficulties in financing this investment in today's uncertain environment are a definite constraint on synthetic development.

Coal gasification appears ready for commercial development, if favorable regulatory price decisions are forthcoming. Several proposed pipeline quality gas projects have been announced and should be moving to the construction stage as soon as favorable regulatory price decisions are made by the FPC.

The high rate of inflation during this past year has caused shale oil economics to appear somewhat less attractive than last year. We believe that what must be resolved is the uncertainty associated with the environmental regulations and the product prices that can be expected to be realized.

New coal liquefaction technology offers the greatest potential for cost reduction and commercialization. The forecast of cost of coal liquids far exceeds the forecast market price. Government participation in technology development for coal liquids may well be justified in the national interest if coal liquids are to become a viable source of energy in the future.

Primary environmental problems include the disposal of spent shale and the effects of operations on air and water quality. Only limited operations have been conducted on small-scale plants. These operations do not provide a firm basis for anticipating the impacts of an entire industry. It is likely that unexpected problems would be encountered in operations on a commercial scale. Major research and development will probably be required to resolve these problems. Ultimate water requirements may be a limiting factor due to the large quantities required for processing synthetics. Availability of water is currently uncertain and determination of legal rights to water may constrain early development.

A synthetic plant will require several years for construction, including mining and processing facilities. There is some question as to the growth rate that a new industry such as synthetics can sustain. Overall, construction of several plants at the same time appears doubtful.

Overall economics of synthetics plants are clouded by the uncertain outlook for oil prices, especially when coupled with the uncertainties of capital costs, inflation, environmental regulation impacts and other potential government policy action.

Exxon USA's 1975 Energy Outlook projects synthetics from coal and shale in the 2 MMB/D oil equivalent range by 1990. Achieving this level of production will require the development of 40 commercial-size plants, each costing about \$1 Billion.

Since synthetics plants are basically capital intensive, long life projects with a product competing in a competitive market, the risks are relatively high in this uncertain environment. If this range of production is to be met, these uncertainties must be cleared as soon as possible.

ALTERNATE ENERGY COSTS

[Dollar per barrel crude oil equivalent]¹

Energy source	Use	Jan. 1, 1975	Cost for 1985 plant startup
Nuclear ²	Power generation	7-9	10-14
Coal burning ³	do	7-12	13-20
Oil shale ⁴	Industrial fuel/syncrude	11-15	16-23
Coal SNG (high B u) ⁴	Industrial fuel	14-20	21-30
Coal liquids ⁴	Industrial fuel/syncrude	16-24	24-36

¹ Costs are expressed as equivalent south Louisiana crude oil values; i.e., the crude oil price or cost at which conventional oil products would be competitive with each alternate energy source for the end use indicated (recognizing capital cost, fuel quality, and transportation cost differences).

² Nuclear: Range reflects locational differences in powerplant costs for U.S. Gulf Coast, midwest, and northeast.

³ Coal burning: Range reflects differences in quality and delivered costs for western, midwestern, and Appalachian coals in powerplants located in U.S. Gulf Coast, midwest, and northeast.

⁴ Synthetic fuel costs include a 15 percent DCF return in a 5 percent general inflation environment. Coal-based synthetics are derived from low quality western coal.

SYNTHETIC FUEL INVESTMENTS

[Dollars per barrel per day]

	Jan. 1, 1975 investment	Investment 1985 plant startup
Oil shale ¹	10, 000-15, 000	15, 000-22, 000
Coal SNG ²	16, 000-24, 000	24, 000-36, 000
Coal liquids ³	20, 000-27, 000	30, 000-40, 000

¹ Oil shale: Estimated costs for pioneer commercial plants are on high side of range. Later plants may achieve lower costs with improved technology or larger scale.

² Coal SNG (pipeline quality): Estimated costs for initial plants using existing technology are on high side of range. Later plants using technology potentially available in mid to late 1980's may have lower costs.

³ Coal liquids: Based on technology still in early development stage; potentially available in mid to late 1980's.

UNION OIL COMPANY OF CALIFORNIA,
UNION OIL CENTER, BOX 7600,
Los Angeles, Calif., September 17, 1975.

Hon. OLIN E. TEAGUE,
Chairman, Committee on Science and Technology, House of Representatives,
Washington, D.C.

DEAR MR. TEAGUE: I am writing in connection with the current deliberations of your Committee on Science and Technology with respect to H.R. 3437, and in particular, its provision of support for the development of synthetic fuel from oil shale. I have had the opportunity to talk with some of the Committee staff; namely, Messrs. Finnegan and Tackabarry, and have requested the opportunity to appear at the oil shale hearings being held by the Energy Research, Development, and Demonstration Subcommittee in October.

Attached for your information is a description of the position of Union Oil Company with respect to oil shale properties, water for the production of oil shale, retorting technology, and a proposed commercial size demonstration plant. Our studies during the past two years have ranged from semi-works size demonstration plants to a full commercial 50,000 barrel per day plant. The conclusion of these studies has been that the most economical and practical approach to the rapid development of facilities to produce oil from shale is a two-phase program starting with one commercial size demonstration module to be followed by a second-phase larger commercial plant as proposed in the attached.

The commercial demonstration has the advantage of minimizing risk, permitting an orderly development of the mine and support facilities, and producing the least socio-economic impact on the community in which we propose to operate. It has the disadvantage of requiring a substantial capital investment over an extended period of time and does not provide, by itself, attractive return on the investment. It requires subsequent larger development to bring the return on investment into the range of attractiveness.

It is our opinion that the loan guarantees, by themselves, as outlined in Section 103 of H.R. 3474, are not adequate incentive to permit proceeding with either a commercial module or larger commercial development as we see it. Our primary concern is not so much about the technical feasibility of the process as it is about the uncertainty of the price of the syncrude and future governmental policy and regulatory activity. The proposed loan guarantees would seem to be designed to provide assurance in case of technological failure but do not speak to the greater uncertainties of price and policy.

We, therefore, feel that a direct financial participation in the initial capital requirement of the commercial demonstration plant more directly meets the initial requirement. We think a grant, convertible to a loan as outlined in the attached, would be the best method. With such direct financial participation, the project could begin immediately and if successful, would incur no cost to the government except the interest on the grant or loan during the construction period. It would also permit a termination of the government's involvement as soon as success is demonstrated.

We have observed the published information regarding the interagency task force recommendations that loan guarantees in combination with price support be used as incentive for commercialization of oil shale to meet a recommended level

of 350,000 barrels per day by 1985. This combination is probably satisfactory for long term, large scale commercial development following the construction and operation of the commercial demonstration plant. The demonstration plant is required to provide cost information as a proper basis on which both government and industry can agree to the terms of loan guarantee and price support. Without the information and experience of the demonstration plant, the level of price support will undoubtedly be considerably higher.

It is our firm belief that it is to the best interest of the government and the industry to see one of each of the several competing retort processes installed in commercial demonstration size as the first stage of an accelerated full commercial development to meet the objectives of the government.

We recommend that legislation to stimulate development of synthetic fuels should include both direct grants or loans for these commercial demonstration plants and loan guarantees and price support for subsequent larger commercial development.

Very truly yours,

JOHN M. HOPKINS,
Acting President, Union Synthetic Fuels Division.

Enclosure.

UNION OIL SHALE POSITION

PROPERTY

Parachute Creek, Colorado. Oil shale lands—20,000 acres. Plant sites and shale disposal—10,000 acres. Location shown in Attachment I.

RESOURCE

Union's oil shale lands contain 1.6 billion barrels of oil recoverable by Union's current technology. This will supply a 150,000 barrel per day plant for 30 years.

TECHNOLOGY

Thirty years of research and development at an accumulated total cost of approximately \$65 million in 1975 dollars (adjusted at 10% discount rate) has produced an upflow retort for shale oil that has been fully demonstrated at rates up to 1200 tons per day (probably the largest oil shale demonstration to date in the United States). The upflow retort is illustrated in Attachments III and IV. Continuing research with a new 5 ton per day pilot plant is confirming and improving design concepts. Our ongoing program of geological and environmental evaluation of the property and engineering design of the facility has produced a technically feasible plant concept as described hereafter.

PROPOSED FACILITY

Union proposes to open a 10,000 ton per day room and pillar mine and build a 10,000 ton per day retort (see Attachment V) on its property in the location indicated on Attachment VI. The retort will be located on a bench at the mine mouth at an elevation approximately 1,500 feet above the valley floor. Attachment VII shows the location of the mine road, mine bench, and mine entrance used for the 1958 operation. The prototype retort will be built on an enlargement of this mine bench and is shown in Attachment VIII. The plant will be complete with gas, oil and water treating facilities necessary to meet environmental requirements and render the oil usable as boiler fuel.

COST

Estimated cost is \$110 million in early 1975 dollars (no escalation provisions included).

PRODUCT SALE

Oil product will be shipped by unit train to an electric utility customer at a price competitive with low sulfur fuel oil. Presently a sale price of \$12.00 per barrel, f.o.b. loading point, is estimated.

WATER

Union has adequate water allocated under Colorado law to supply the full 150,000 barrel per day development without further demands on unallocated water of the Colorado River Basin.

ENVIRONMENTAL

Baseline Environmental Data are being taken in 1974 and 1975 at a cost in excess of one million dollars. Environmental impact assessment is being written. It is expected that design can meet environmental standards providing the oil shale area is accorded the same level of requirement as other developed areas of Colorado. Retorted shale will be deposited on valley lands owned by Union in such a manner that the surface areas can be revegetated for productive use. There will be no waste water effluent from the operation for discharge into surface waters.

TIMETABLE

Environmental assessment will be available for government consideration by the end of 1975. Site preparation and road construction is proposed for 1976 to permit plant construction to start in 1977 with completion in early 1979. Schedule is shown in Attachment IX.

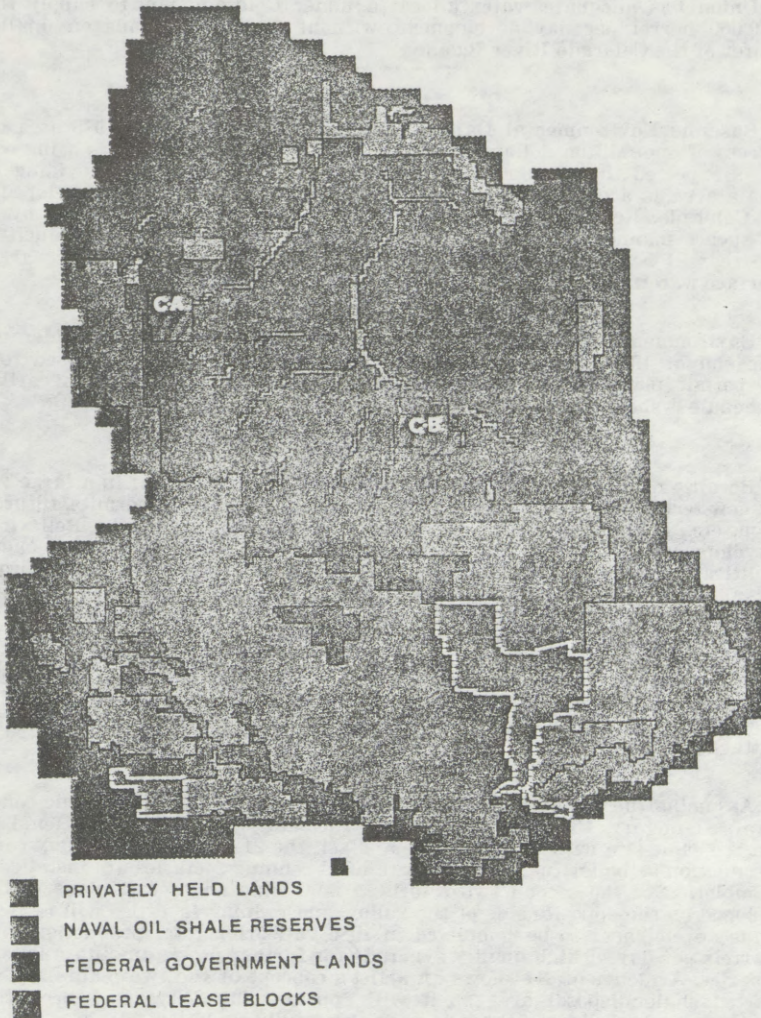
FINANCING

Because of uncertainties of future oil prices, risks inherent in a large venture in new technology, and indeterminate problems of obtaining permits, future inflation, etc., it is not presently possible for Union to proceed alone. Believing that development of an oil shale industry is essential to the future economic and political security of the nation, it is requested that the Government provide a grant to cover 80% of the cost of the project, the grant to be convertible to a loan bearing 5% interest at such time as the plant is in operation. If the venture is successful, the loan will be repaid from revenue from the sale of product after meeting Union's operating maintenance and capital costs and a nominal royalty (70¢ per barrel) for the value of resource consumed. It is estimated that the loan will be retired in less than 10 years. If the venture is unsuccessful, provision is made for abandonment of the project. Preliminary form of agreement is in Attachment X.

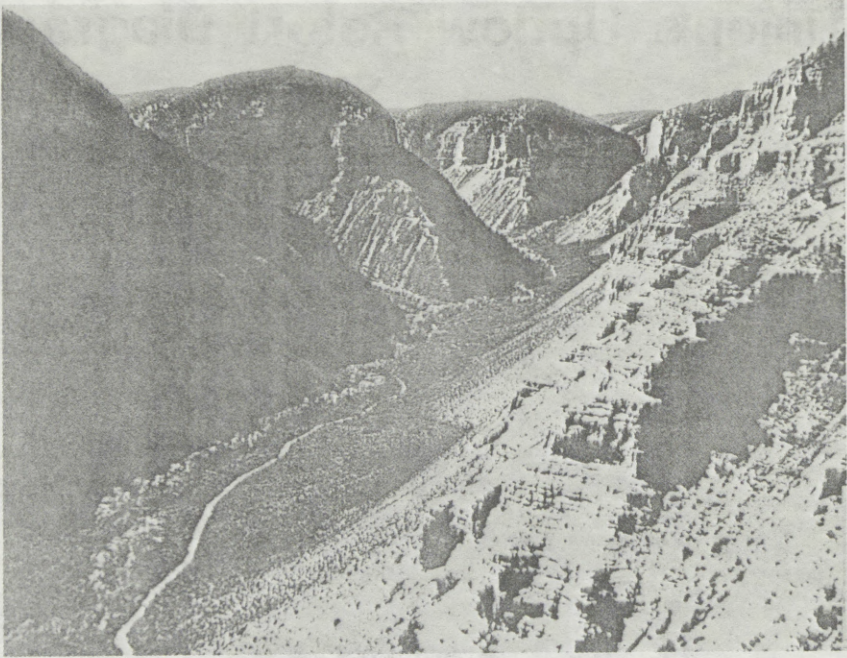
SUBSEQUENT DEVELOPMENT

Assuming the prototype retort operation is successful and economic conditions are satisfactory, Union expects to construct and operate two additional retorts on the same site with the prototype and sell the 21,000 barrels per day combined production as boiler fuel as an interim until refining facilities are installed. Upon completion of the second two retorts, a new mine and retort plant will be developed on the opposite side of the valley, and refining facilities will be installed. This development to be completed in 1986 will bring total production to 70,000 barrels per day of high quality syncrude for further processing in established refineries. Attachment XI shows an artist's concept of the two plants and the retorted shale disposal area as it will appear some 25 years hence after the property on both sides of the canyon has been fully exploited.

Piceance Creek Basin Oil Shale Ownership

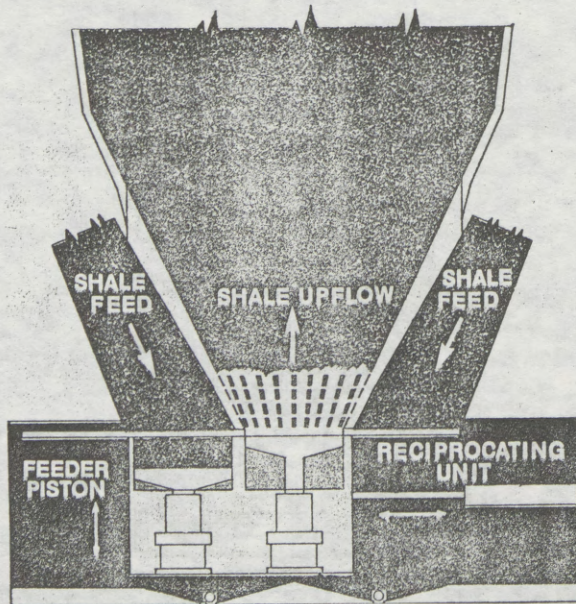


ATTACHMENT 1



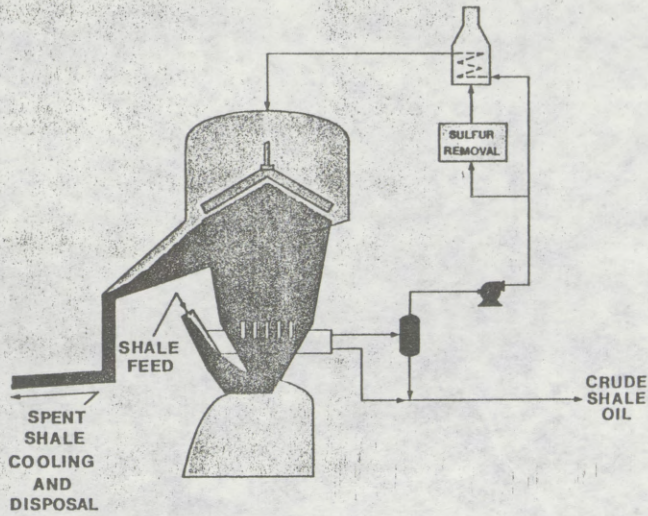
ATTACHMENT 2

Union Upflow Retort



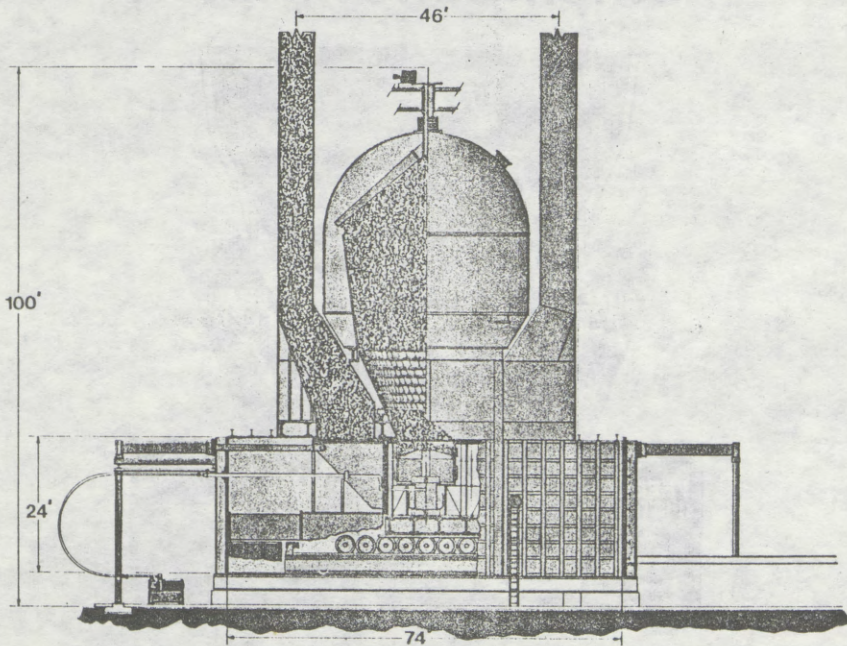
ATTACHMENT 3

Union's Upflow Retort Diagram



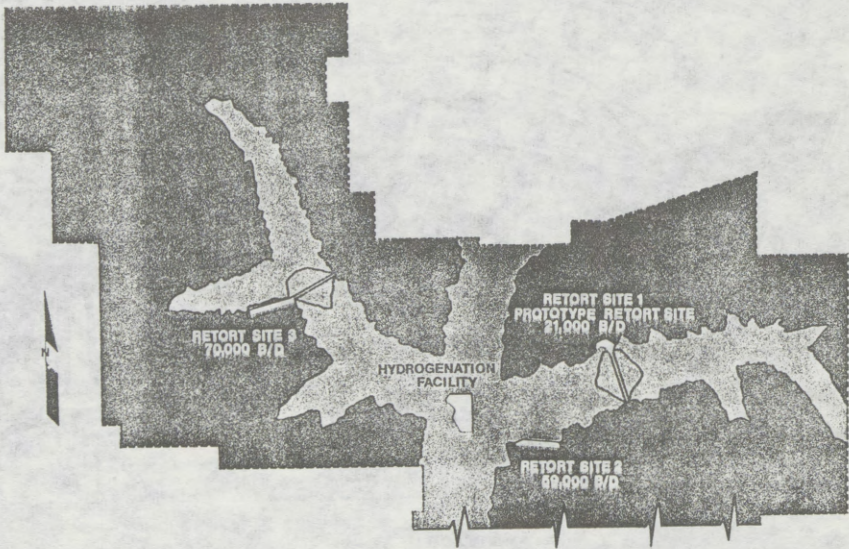
ATTACHMENT 4

10,000 T/CD Upflow Retort



ATTACHMENT 5

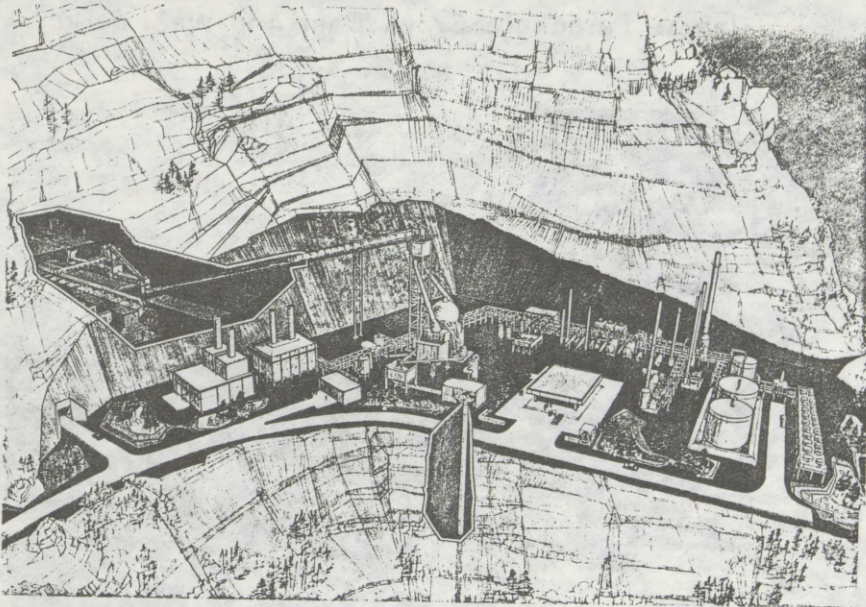
Union's Parachute Creek East And West Forks



ATTACHMENT 6



ATTACHMENT 7



ATTACHMENT 8

UNION OIL COMPANY OF CALIFORNIA

7-1-75

OIL SHALE PROGRAM

PROTOTYPE PLANT

1. PRELIMINARY DESIGN & FACTORED ESTIMATE
2. PREPARE DEFINITIVE DESIGN CRITERIA
3. AREA & WATER PLANNING
4. FEDERAL IMPACT STATEMENT
 - a. IMPACT ASSESSMENT FORMAT
 - b. SOILS INVESTIGATION
 - c. FIELD ENGINEERING SURVEY
 - d. DESIGN INFORMATION & DRAWINGS FOR IMPACT ASSESSMENT
 - e. ENVIRONMENTAL DATA (FROM ITEM 6)
 - f. IMPACT ASSESSMENT (FEDERAL)
 - g. IMPACT STATEMENT BY FEDERAL AGENCY
5. STATE & COUNTY
 - a. COUNTY IMPACT ASSESSMENT & STATE PERMITS
 - b. DESIGN INFORMATION & DRAWINGS FOR IMPACT ASSESSMENT
6. DEFINITIVE DESIGN & ENGINEERING SUPPORT
7. PURCHASING & CONSTRUCTION
8. ENVIRONMENTAL STUDIES & REVEGETATION
9. GEOLOGY & WATER
10. LAND MANAGEMENT

	1975	1976	1977	1978	1979	ESTIMATED EXPENDITURES THOUSANDS \$				
						COL. 1 TOTAL 1975 ON	COL. 2 APPROVED FOR 1975	COL. 3 APPROVED FOR 1976	COL. 4 PROJECTED FOR 1976	COL. 5 PROJECTED AFTER 1976
						985		985		
						850		850		
						100		25	25	50
						10		10		
						160		80	100	
						228		75	150	
						200		200		
						210		210		
						250			250	
						75		75		
						75		75		
						15,000			3,000	12,000
						95,500			8,500	87,000
						113,660		2,585	12,025	59,000
						1,285	960	125	100	100
						1,125		225	500	400

ATTACHMENT 9

PROTOTYPE OIL SHALE PROJECT

INTRODUCTION

Following are certain basic principles for a proposed agreement between the United States of America (the Government) and Union Oil Company of California (Union), regarding the mining of oil shale rock and the construction and operation of a prototype oil shale retort upon Union's patented oil shale holdings

in the Parachute Creek area in Colorado; the marketing of shale oil produced by said retort; and the substantial financing of the project by the Government, and its repayment out of cash generated by the project.

INTENT OF PROJECT

Union has been active for about 50 years in the acquisition of oil shale reserves; in the research and development of oil shale mining, retorting and refining; in the development of requisite water supplies, and in design studies of commercial mines and plants, of spent shale disposal and of environmental protection processes. This technology, expertise and know-how will provide the foundation for the construction and operation of the proposed commercial-size prototype oil shale retort and related project facilities. It is recognized that because of monetary inflation and the instability of foreign oil prices and sources, the investment is so large and the economic risks so great, that neither Union nor any other private company can prudently proceed independently upon a shale oil project of this magnitude.

The Government has recognized, and is concerned over the Nation's loss of energy self-sufficiency, and especially in the shortage of petroleum. In order to preserve the economic well-being and security of the Nation, the Government has expressed a desire to foster the development of alternate energy industries, including a shale oil industry to achieve their objectives. The Government can provide special economic incentives and generally exert its legitimate influence to foster the formation of a shale oil industry in the United States.

If the Government would assist in the financing of Union's proposed shale oil project, Union, in turn, would utilize all of the technology and expertise it has achieved (at substantial cost) to implement the project as expeditiously as possible.

DESCRIPTION OF MINE AND RETORT

Union would develop and operate an oil shale mine of approximately 10,000 tons per day capacity, upon its patented oil shale properties in the vicinity of Parachute Creek, in the Piceance Basin of the State of Colorado (approximately 20,000 acres, containing 1.6 billion barrels of recoverable oil.) Union will also build and operate a prototype commercial-scale retort, to retort the oil shale rock mined to produce a shale oil suitable for use as fuel in steam-electric power plants. The retort would be of the rock upflow type, which Union has already developed and operated on a demonstration plant scale. The design capacity will be 10,000 tons of rock per day, which with a feed of shale assaying 30 gallons of oil per ton, will yield about 7,000 barrels per day of shale oil. The retorting medium will consist of hot gases flowing counter-current to the oil shale, which processing scheme is known as Union Retort B. Crushers, conveyors, loading racks, spent shale disposal sites, pipeline, water systems, and other related facilities will also be constructed.

MARKETING OF SHALE OIL PRODUCED

Union will negotiate marketing arrangements for the shale oil produced. It presently appears that a number of electric utility companies desire assured long-term supplies of fuel. It is expected that a firm long-term contract, or contracts, can be made for sale of the shale oil to one or more of them. The initial price would be competitive with conventional residual fuel oil, of comparable quality, produced from petroleum. Appropriate price escalation and floors will be incorporated in the sales contracts.

THE PROJECT

The mining of shale oil, the design, construction and operation of the retort, water supply system, roads, pipelines, loading and transportation facilities, and the operation of these and all auxiliary facilities and activities, and the production and marketing of shale oil are herein collectively referred to as the "Project."

CONTROL OF THE PROJECT

Union shall control the work, make all decisions, and approve expenditures of the Project. Union will make every reasonable effort, in good faith, to expedite the Project and foster its success.

TRANSPORTATION

The shale oil will be shipped by unit trains of tank cars to the customers. A high-speed loading rack for loading the oil into the train will be constructed in the general vicinity of the shale retorting facility.

CAPITAL INVESTMENT

Union has engaged an independent firm of engineers to perform the detail design engineering, and to make estimates of cost of construction, operating costs and labor requirements of the Project. The estimated capital construction cost of the Project is \$110,500,000. (1975 dollars—no escalation included.)

FINANCING THE MINE AND RETORTING PLANT

It is proposed that the Government provide 80 percent of the initial capital investment, and startup costs and initial working capital required by the Project, in the form of a grant or defeasible loan to Union. On the basis of the present estimates of cost of construction, (\$110,500,000) the Government contribution to such costs would be approximately \$88,000,000. Union would supply the funds for the remaining 20 percent.

Upon completion of construction, the Government and Union would supply funds in a similar 4 to 1 ratio, to cover startup costs and the necessary infusion of working capital together, presently estimated to be \$—— (1975 dollars.)

DRAWDOWN OF THE GRANT

The Government would make the funds available to Union monthly during the course of construction, as needed to meet its share of costs. The amount of the monthly drawdown would be in the proportion of four dollars of Government funds per dollar of funds supplied by Union. Union would supply statements of expenditures and reports on progress of work to substantiate the need for and use of construction funds.

The Government would make its share of startup costs and working capital available to Union, upon completion of construction.

CONVERSION OF THE GRANT TO A LOAN

The Government's grant shall become a loan, and interest thereon, at the rate of 5% per annum, shall commence on the first day immediately following completion of the Project, and the completion of a test design capacity period in which the retorting plant operates at or above design capacity for 30 consecutive days. Payments of interest and principal shall be made annually out of cash generated by the Project, after payment of certain costs, as hereinafter specified.

LOAN PAYMENT FORMULA

Payments of principal and interest to the Government by Union shall be made only from cash remaining from revenues realized from sale of the shale oil, after deducting the following costs, in the following order of priority:

1. Cash operating costs, estimated to be \$4.70 per barrel of oil;
2. Oil shale royalty to Union of \$0.70 per barrel of oil sold; and
3. Capital cost to Union (to be defined later, depending on amount of loan and Union's investment).

Such payments shall be applied first to payment of interest, and then to principal.

If the Project operates successfully, payments will be made on the loan until it has been discharged. Assuming an 80 percent loan and based on current facts, it is estimated that the loan will be retired in less than 10 years. Conditions under which the Project may be abandoned and the loan cancelled are hereafter specified. Union shall have the right, but not the obligation, to pay the balance of the loan in full at any time. Whenever the loan has been repaid, all interests of the Government in the Project will terminate.

ACCOUNTING

The Project's books of account will be kept by Union, in accordance with accounting procedures to be agreed upon. The books shall be subject to audit by the Government, at any reasonable time, and the Government may have inspec-

tors and auditors on the Project, in reasonable numbers and at reasonable times, until the Project has been terminated or the loan has been paid off.

TECHNOLOGY

The retorting technology upon which this Project is based, has been developed by Union over the past 30 years. All prior technology and any new technology and know-how developed in the Project will belong to Union exclusively, if the Project is successful. If the project is not successful, Union and the Government shall negotiate a value for the new technology that may have been developed, and Union shall have the right to buy it at that value. If Union does not buy it, it shall belong to the Government. In any event, Union shall continue to own the prior technology.

COMMERCIAL ADDITIONS TO PROTOTYPE BY UNION

When in Union's judgment the Project has operated well enough to justify expansion, Union shall have the right so to proceed independently, after having first notified the Government of its intention to do so. The Project shall be declared commercial after the construction and successful on-stream operation of one additional commercial-size retort. At that time, if Union so elects, payments on the loan shall be disconnected from cash flow generated by the prototype retort, and the loan and accrued interest shall then be paid in full by Union or, at Union's option, converted to a level-pay loan, at the same interest rate, for which Union will be personally liable, with annual payments of a size such that the loan will pay off in a period of 15 years from the date on which interest first commenced on the original loan. Union will be liable for the repayment of the loan, if so converted.

If the loan is so converted, or paid in full, Union will no longer be required to submit reports to the Government covering operational and financial affairs of the Project. The Government rights to audit Union's books of account on the Project, and to have observers on the plant site, will terminate. In the event that Union defaults on the loan, Union shall again be obligated to furnish reports to the Government, and the Government shall again have audit and observation rights until the loan payments have been made current, or the loan has been paid in full.

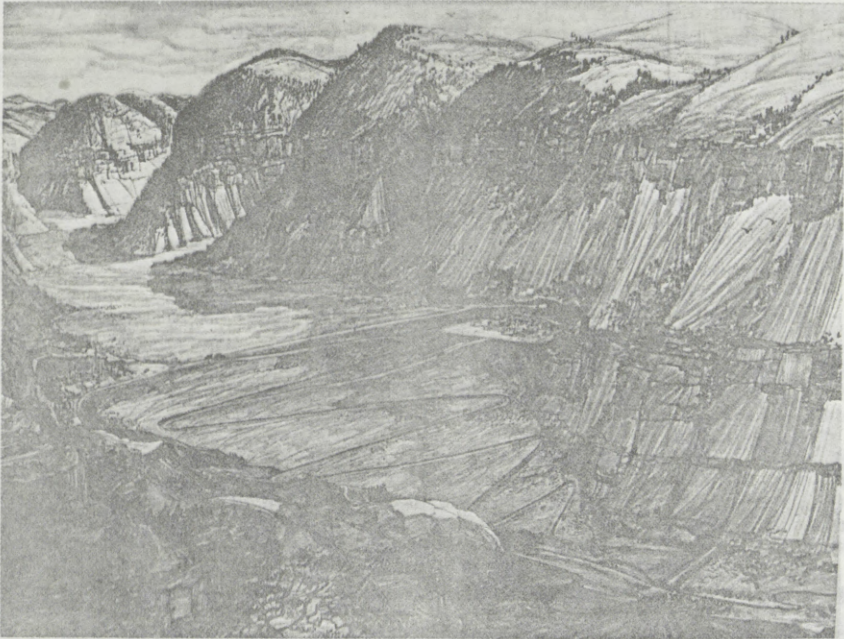
TERMINATION OF THE PROJECT

Union will operate the Project for a period of at least two years, after it has been operating steadily at or above design rate for 30 days. At any time after that, Union may declare the Project ended, if: The Project has failed to produce a positive cash flow for any 12-month period, or the accumulated negative cash flow incurred during startup and subsequent operation of the Project is in excess of \$———. Union may also declare the Project ended if the prototype plant cannot be made to operate at its design rate within a period of two years of diligent effort to make it so perform.

If Union declares the Project ended for one or more of the foregoing causes, the prototype plant will be shut down and mothballed or dismantled at Union's expense. The Government will have no further rights in the Project, or any of its facilities. Union will not start the prototype plant up again for a period of three years. The Government will give up all rights to payments of principal and interest on the loan, and will cancel all Union's obligations under the loan.

OTHER CONSIDERATIONS

The Project will be designed and operated to comply with applicable environmental, health and safety standards. It will be managed in compliance with Federal goals for minority and female employment and advancement, and other appropriate aims of the Government.



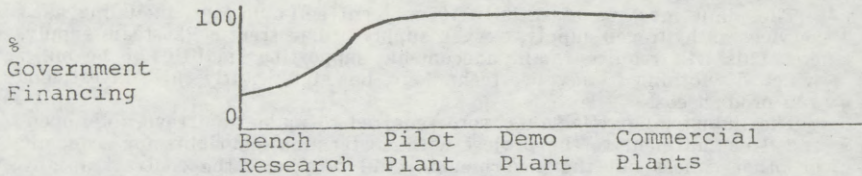
ATTACHMENT 11

STANDARD OIL COMPANY OF CALIFORNIA,
San Francisco, Calif., September 16, 1975.

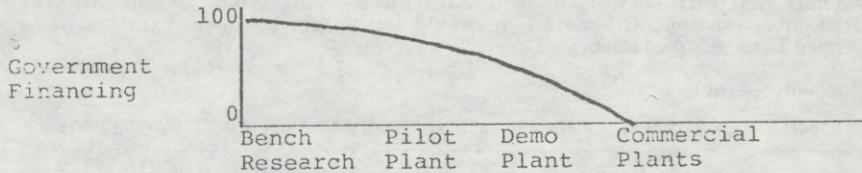
Re S. 598 ERDA Authorization, section 103.

MR. F. W. BRADLEY: Various legislative proposals, such as S. 598, have been proposed to reach the goal of 1,000,000 barrel/day coal derived liquids by 1985.

Attaining this goal would require the construction of uneconomical plants producing \$20-\$25/barrel synthetic oil versus \$10-\$12/barrel petroleum. If free economy market forces were allowed to determine the timing of new synthetic fuel plants, their arrival would occur closer to the year 2000 than the year 1985. However, if national policy determines that 10-20 coal liquefaction plants are required in this country by 1985, then the government must face up to a funding scheme that will require essentially 100% government financing. After a consideration of financing schemes, including floor price, guaranteed purchase, loan guarantees as in S. 598, tax, and investment credits, we conclude that only a cost plus fixed or incentive fee basis was reasonable to sustain the ten-year effort in the face of political realities. Further, the ratio of industry/government funding would look similar to this sketch.



The present mode of financing established by OMB and used by OCR, now ERDA fossil fuels, is the following:



This present mode of government funding invites unstructured schemes for the initial research since it is supported 100 percent by government. Industry participation at the demonstration plant level is set at 50 percent with 33 percent at the pilot plant stage. The demonstration plants will be extremely expensive and will not be close to being profitable: Industry is very unlikely to support a venture of this kind. If government funding is minimal at the initial research phases, a number of companies can try varied approaches in the \$50,000-\$200,000 range hoping to acquire a novel process and obtain patent rights. Then with increasing government support in the pilot plant and full funding of the demonstration plant, a 1985 commitment might conceivably be met. However, 1985 completion of commercial plants based on technology now in the pilot plant stage will be very tight. Bench scale research will do well to reach commercial status in 15 years. Thus, 1990 is the earliest credible goal for processes not yet at the pilot stage.

It may be to the government's policy interest to build several demonstration plants with the most efficient processes available though capital charges are so great that the final product is not economic versus crude oil. A requirement of a commercial size stand-alone demonstration plant increases the cost considerably compared to a demonstration of a process in an existing plant where auxiliary services and waste treating facilities are available. The attached table shows the cost figures for the demonstration of clean liquid boiler fuel from coal as proposed by the Old Ben consortium to the OCR in 1974 and the demonstration plant awarded to Coalcon which involves a stand-alone facility.

OCR believed (and ERDA may still do so) that the industry participant(s) in the coal liquefaction demonstration would make money (by operating the plant at a profit). As a result, OCR imposed numerous obligations on the bidders for this demonstration contract, presumably both to ensure that the demonstration was convincing and to prevent the venture being too profitable. We were (and are) convinced that even with 50 percent federal funding the demonstration will lose money, certainly on ERDA's terms. We are evidently not alone in this view. Over 30 companies responded to the request for proposals. Only three bid. Only a single bid was responsive to most of ERDA's terms. (None of the bidders was a major energy company.) The onerous conditions imposed by ERDA included:

Industry and government share investment and operating cost 50:50. Industry presumably brings most of the expertise, but the government will exercise complete control of design and construction.

Construction and design must be performed by different architect-engineering firms (except by special approval of the Secretary of the Interior).

The Buy American Act of 1965 will control the purchase of foreign equipment and technology. Federal purchasing regulations will determine bid and award procedures on all equipment. (These differ from industry procedures in opening all contracts to essentially all bidders, with the award going to the low bidder. Industry generally uses restricted bidder lists to ensure that only qualified bids are received. The difference is significant.)

The plant must be essentially 100 percent self-sufficient, including such services as hydrogen supply, oxygen supply, waste treatment, steam supply, etc. This will require small, uneconomic supporting facilities to be built, which do nothing to advance technology, but significantly raise investment and product cost.

The industrial participants were required to make an irrevocable, open-ended commitment to the project with no termination rights for economic or other causes but the government could terminate the contract at any time.

Some of these onerous conditions are determined by acts of Congress rather than ERDA; but regardless of origin, the overall effect is to discourage industry. Since we would welcome the construction of the Coalcon demonstration plant, we hope that ERDA will be accommodating in its contract negotiations with the Coalcon consortium. Otherwise, we would not expect the demonstration to be carried through to construction.

R. H. LINDQUIST.

Enclosure—Table I.

TABLE I.—COMPARISON OF OLD BEN AND COALCON COAL LIQUEFACTION DEMONSTRATION PLANTS

	Old Ben ¹	Coalcon
Basis.....	Unsolicited company proposal.....	OCR demonstration plant RFP.
Sponsors.....	Old Ben Coal (Sohio) and Consolidation Coal	Coalcon (Union Carbide and Chemical Construction Co.).
Plant size.....	900 tons per day coal.....	2,600 tons per day coal.
Plant size determined by.....	Careful analysis of minimum size to give reliable data and to avoid significant scale-up problems when going to commercial size.	Unknown. OCR required 2,000 tons per day minimum.
Estimated program cost.....	\$83,400,000 (including \$42,600,000 capital cost).	\$237,000,000 (including \$21,000,000 design cost with 100 percent Federal funding.)
Facilities to be provided.....	Slurry preparation, slurry pumping and heating, extraction, solids preparation, solvent recycle, extract hydrocracking, residue carbonization, by-product gas cleanup, sulfur plant.	All.
Services to be supplied from existing facilities.....	H ₂ supply, steam, water, air, maintenance, water effluent treating.	None.
Value of support facilities.....	\$10,400,000.....	None furnished.
Minimum operating life of new facilities.....	Approximately 3 yr.....	20 yr.
Project basis established by.....	Sohio and Consolidation Coal.....	OCR.

¹ From project agreement Oct. 1, 1974, Old Ben Coal Prototype, Inc.

INFORMATION SUBMITTED BY HENRY R. LINDEN, PRESIDENT, INSTITUTE OF GAS TECHNOLOGY

A broad consensus exists that synthetic gaseous and liquid fuels from coal offer the nearest term and most economical solution to the supplementation of our diminishing resources of natural gas and crude oil. The alternative of continuously increasing imports of crude oil is not practical because world productive capacity is expected to peak not later than the turn of the century with an attendant precipitous increase in world oil prices far greater than what was experienced following the 1973 oil embargo. Therefore, even if there may be some uncertainty about the relative economics of synthetic fuels compared to world oil prices in the relatively near term, the longer range outlook leaves no uncertainty as to the merits of developing supplemental sources of gas and oil. The remaining lead time of a maximum of 25 years until world oil production will begin to decline is already too short to achieve large-scale synthetic fuels production, unless something approaching a crash program is initiated quite promptly. In the past, it has taken approximately 60 years in the United States to switch from one major fuel source to another—from predominant use of fuel wood and wind and water power to the predominant use of coal and, in turn, from the predominant use of coal to the current situation when some 75 percent of our energy supply comes from natural gas and petroleum. It was, of course, hoped that the next cycle would be the predominant use of nuclear energy by the first quarter of the 21st century but this is now in doubt for a number of reasons which need not be stated here.

Fortunately, the United States is blessed with an abundant supply of coal—not the 500 years one still sees in print at times but, combined with the remain-

ing oil and gas resources and the large oil shale resources, enough for roughly 100 years at a rate of energy demand growth of somewhere between 2 and 3 percent per year. Coal represents about 75 percent of our remaining fossil fuel resources, which is the reason for the consensus mentioned earlier that reliance on coal, either directly or in the form of synthetic fuels, must be a mainstay of our Nation's energy future.

An alternative to the conversion of coal to synthetic fuels which must be considered is its conversion to electricity. As discussed in Exhibits 1 and 2, the relative economics of coal-by-wire as compared to coal-by-gas-pipeline in terms of the actual energy costs to the ultimate consumer appear to show a clear-cut advantage for high-Btu pipeline gas. This is the case even if the electric case assumes the use of such high-efficiency utilization systems as the electric heat pump (see Exhibit 2). Therefore, the arguments favoring the production of synthetic fuels from coal and, in particular, high-Btu pipeline gas from coal seem to be overwhelming: 1) an abundant domestic source of the basic raw material; 2) a rapidly dwindling supply of natural gas and crude oil; 3) the certain prospects of further large increases in world oil prices and a question of availability of supply in the longer term even at astronomical prices; and 4) a well-documented economic advantage to the ultimate customer for receiving coal energy in the form of synthetic fluid fuels compared to electricity.

The case for synthetic pipeline gas from coal is especially strong. Natural gas is in critically short supply, to the extent that in the current year 20 percent of the firm net requirements of the major interstate pipelines, totalling 15 trillion cu ft, will have to be curtailed. This alone is equivalent to 1.5 million barrels of additional oil imports needed per day if this demand cannot be met with other domestic sources. Therefore, the delivery system for 3 trillion cu ft of pipeline gas is already in place, ready to receive supplemental supplies at minimal incremental cost. This unused capacity, representing an investment of several tens of billions of dollars, will increase rapidly if the decline in productive capacity of natural gas of on the order of 6 percent per year is not stemmed quickly by a variety of measures now under active consideration. With this critical situation in the supply of natural gas which, even with its declining trend, still provided about one-third of our Nation's energy supply in 1974, the creation of a large-scale synthetic pipeline gas from coal capacity should be an obvious priority of the Nation.

For the reasons summarized above, and given in more detail in the attached exhibits, most recent energy supply projections have included a substantial portion of synthetic fuels and in particular, high-Btu pipeline gas from coal (see Table 5, page 8, Exhibit 1). For example, in the President's State of the Union message in January 1975, 2 quadrillion Btu of synthetic fuels supplies were projected for the year 1985, which is equivalent to either 2 trillion cu ft of natural gas per year or 1 million bbl of oil per day. From the background information for this projection, it appears that about 70 percent of this synthetic fuels forecast was assumed to be high-Btu pipeline gas from coal (see Table 7, page 9, Exhibit 1). This high percentage of synthetic pipeline gas from coal is substantiated by the announced commercial high-Btu coal gasification projects. These projects, including plant expansions, would already provide this amount of synthetic fuel (see Table 6, page 9, Exhibit 1). With all of these factors in favor of rapid development of synthetic pipeline gas from coal, the obvious question is why progress has been so painfully slow.

It is not that the price of synthetic pipeline gas from coal is high compared to other synthetic fuels or to coal-based electricity (see Figure 8, page 10, Exhibit 1, and Exhibit 2). The major barrier to moving ahead with commercialization of synthetic pipeline gas is the uncertainty of the situation as viewed by the investor. Various policy options open to the Federal Government can have a major and sometimes unforeseen impact on this uncertainty. For example, a key role will have to be played by the Federal Power Commission in utilizing the available regulatory machinery to ensure that the investors in interstate synthetic pipeline gas from coal projects will recover their investment through rates paid by the ultimate customer even if, due to uncontrollable circumstances, actual costs are substantially higher than originally projected. In this regard, the singling out of supplemental sources of pipeline quality gas as a target for incremental pricing further adds to investor uncertainty because the impact of high synthetic fuel costs would be greatly magnified.

Regulatory treatment which properly recognizes and assigns the risks of synthetic fuels projects will not only be an essential prerequisite in the establishment of a high-Btu pipeline gas from coal industry but will also be necessary for

introduction of synthetic boiler and turbine fuels (such as low-Btu gas, solvent-refined coal, and methanol) by the regulated electric utility industry. There are, of course, many other mechanisms to increase investor confidence in synthetic fuels. Many proposals have been put forth by various Executive agencies and departments and in Congress to encourage the development and commercialization of synthetic fuels above and beyond the legislation already on the books. They include such mechanisms as government purchase of specified quantities of synthetic fuels at price levels which reflect their true cost; construction of synthetic fuels plants by the government, on sites adjacent to reserves owned by the government, for leasing to private interests at rates commensurate with the existing market price of competitive fuels and provision for purchase of such facilities and reserves by the operator after the plant has proved to be profitable; government guaranteed construction loans and long-term debt for synthetic fuels plants; and many more.

In assessing the magnitude of the problem of financing synthetic fuels projects, Figure 9, page 10, and Appendices A and B, pages 15-19, Exhibit 1, are of interest. It can be seen that the costs of high-Btu pipeline gas from coal projects, as well as of all other major energy projects—be they nuclear or coal-fired electric plants, syncrude from oil shale and tar sands projects or Arctic pipelines—have all roughly doubled during the last two years. The normal utility regulation process and the investment decision processes of energy company managements have not been able to cope with this unprecedented cost escalation problem in view of the many uncertainties in our Nation's energy policy. It is, therefore, no surprise that energy company managements and the financial community have been reluctant to assume the large risks which these cost uncertainties entail, in spite of the fact that they apply uniformly to *all* energy sources and in spite of the near-certainty that world oil prices will quite soon exceed the cost of synthetic fuels. Clearly, some form of governmental action will be necessary to overcome this barrier to urgently needed domestic energy supply development.

At present, the total investment cost for the processing plant alone (that is, excluding coal and water supply, and pipeline connections) for a 250 million cu ft per day commercial technology (i.e., Lurgi) gasification plant in 1975 dollars is on the order of \$800-850 million for Western coal and on the order of \$900-950 million for Eastern coal. Several recent estimates confirm that second generation pipeline gas from coal technology, as exemplified by the HYGAS Process which has been carried to large-scale pilot plant operation under the joint sponsorship of the Energy Research & Development Administration and the American Gas Association, would have an investment cost roughly 80 percent of existing commercial Lurgi technology. To this must be added the cost of the coal mines and coal transport facilities, the water supply facilities and the pipeline connections, so that, for any given project, the total investment will be on the order of \$1 billion or more. For reference, 250 million cu ft per day of synthetic pipeline gas is roughly equivalent to 45,000 bbl per day of crude oil. Clearly, means will have to be found to reduce the risks involved in making such huge investments to the point where financing of such projects becomes feasible.

In closing, I wish to note that there is probably no investment in our national resources with better prospects for near-term pay-off than in fossil fuel R&D. A single, 250 million cu ft per day second generation coal gasification plant will save the ultimate consumers of the gas produced during each year of its 20 or more years of operation roughly the current annual Federal expenditure for high-Btu coal gasification R&D. Finally, it is also important to note that these potential savings with new technology which are still several years from commercial application, having yet to go through the demonstration plant stage, in no way invalidate the current program to promptly build and operate commercial technology plants. Only a very few years of continued inflation will wipe out the cost differential, so that first generation plants will be able to operate economically side-by-side with newer, second generation plants.

EXHIBIT 1

IS THE SYNTHETIC FUELS OPTION CREDIBLE?¹ BY HENRY R. LINDEN, INSTITUTE OF GAS TECHNOLOGY, CHICAGO, ILL.

The credibility of synthetic fuels, that is, substitutes for the conventional liquid and gaseous hydrocarbon fuels derived from petroleum, has undergone

¹ For Presentation at National Energy Forum III, Washington, D.C., May 15-16, 1975. (Figure 9 and Appendix A updated September 1975.)

wide gyrations during their long history. Whenever their production from coal, oil shale, or tar sands and other bitumens seemed to be the answer to a supply or economic problem, conditions changed quickly and wiped out whatever fledgling synthetic fuels effort existed. Synthetic fuels industries have played a significant role when war and related geopolitical factors temporarily forced autarky in hydrocarbon fuels on a nation; Germany and Sweden are good examples. However, the most notable, long-lived and, in fact, growing exception is the SASOL project in South Africa. There, the combination of extremely cheap coal, exceptional technical competence and dedication, and unwavering governmental support occasioned by South Africa's political and economic isolation have created the ideal climate for a viable synthetic fuels industry.

The question before us here is if we can foresee conditions in the United States which will make liquid and gaseous synthetic fuels a credible option for supplying a significant share of total energy requirements from around 1985 until either the exhaustion of the huge domestic coal and oil shale resources or the development of alternative energy forms derived from nonfossil sources that are preferable because of economic, logistic, or environmental factors. The reasons this question is currently receiving so much attention are, of course, identical with those that caused earlier similar interest in many other industrial nations. They are: (1) the belief that national security requires a degree of control over the supply of such essential commodities as hydrocarbon fuels that cannot be achieved by other means, and (2) the belief that the development of alternative sources of hydrocarbon fuels from more abundant domestic resources will produce an economic benefit by providing them at lower cost than otherwise available, or by reducing international trade problems, or by simply stimulating domestic economic activity and employment.

Following World Wars I and II, and especially in the heady days following the oil embargo and the precipitous increase in world petroleum prices, these beliefs were widely shared by many in government, industry, and the technical community. In the two earlier instances the enthusiasm for synthetic fuels dissipated quickly as the costs and technical and institutional barriers to extensive development became better known and as our free market system was allowed to do its magic and come up with adequate and relatively cheap new supplies of oil and natural gas. As a result, until the full recognition of the natural gas supply crisis in 1971, synthetic fuels were largely a subject for R&D, and even this activity was starved for funds until the fall of 1973 because of the low credibility of this option. One unfortunate consequence of this dearth of interest in synthetic fuels was that, when the current resurgence of interest in synthetic fuels began, there were only about 100 senior technical people in the United States with sufficient background to do much about the problem. Because of an even more complete abandonment of interest in synthetic fuels in the rest of the world (except for South Africa), the total global manpower resource with synthetic fuels experience was probably not more than double that number.

Let me now try to tell you why I believe that, this time, synthetic fuels may actually achieve significant commercial development in the United States in spite of all the formidable historical barriers plus a few new ones. First of all, this time, we are really experiencing the effects of resource limitations on oil and natural gas supply quantities and costs, at least in the Lower 48 States. Few now believe that, even with very substantial increases in economic incentives, we could do any better than maintain our current lower-48 production levels for the next 25 years. Alaska has, of course, a substantial added potential, but, because of the high costs associated with bringing Alaskan oil and gas to lower-48 markets, this will not invalidate the synthetic fuels option.

Second, the Organization of Petroleum Exporting Countries (OPEC) isn't going to abandon marketing practices which are considered quite normal and sound throughout much of the world. Certainly, if the current world recession continues or deepens, oil prices may soften further and even experience a sharp temporary decline. But, if we are at all optimistic about the economic future of the Western World, demand will soon approach productive capacity again and world oil prices are likely to increase to roughly late 1973 to early 1974 levels, plus inflation, plus dollar devaluation. Although the economic basis may be tenuous, the equivalence of the \$12 per barrel embargo level and what were then believed to be synthetic fuels costs seems more than a coincidence. Therefore, since current (1975) estimates of synthetic fuels costs are \$2.50 to \$4 per million Btu, I wouldn't be surprised if world oil prices will again approach this "ceiling," that is, at least \$15 per barrel and maybe as high as \$20 or more in 1975 dollars. There will be no shortage of oil: The estimated ultimate world

resource base of 3000 billion barrels should allow quadrupling of 1974 production of roughly 21 billion barrels before depletion will limit productive capacity. But it would seem imprudent for oil producers to sell off this depleting resource at bargain rates substantially below the cost of replacing it with any competitive energy forms.

The third reason why synthetic fuels may make it this time is that the great expectations for rapid progress in energy conservation are probably not attainable. They are based on a long series of misunderstandings, such as that incentives for energy conservation started only in the fall of 1973 and that prior to that time intentional energy waste was commonplace. This is simply not true. During the period following World War I until the end of the Korean conflict, the ratio of U.S. energy consumption to gross national product (GNP) decreased from about 140,000 Btu per 1958 dollar to 80,000 Btu per 1958 dollar. (See Figure 1.) This large improvement in the effectiveness of energy use in the produc-

TREND OF ENERGY CONSUMPTION PER UNIT OF GNP IN THE U.S.

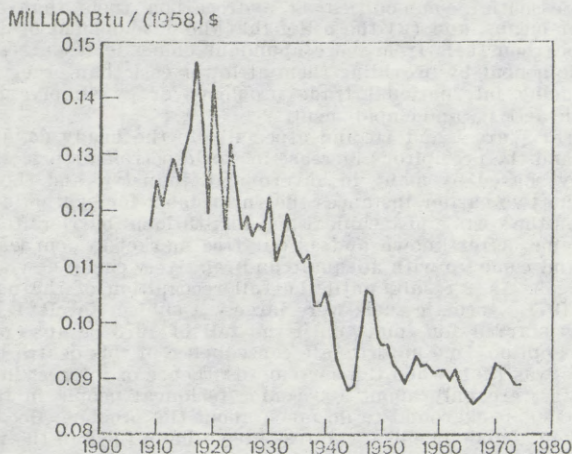


FIGURE 1

TREND OF THE RELATIVE PRICE INDEX FOR FUEL AND ELECTRICITY

SOURCE: BUSINESS STATISTICS, U.S. DEPT. OF COMMERCE
1959 AND 1973 EDITIONS

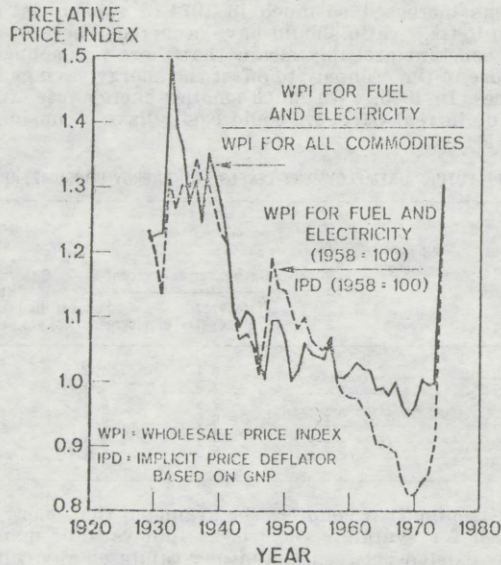


FIGURE 2

tion of goods and services occurred while the deflated cost of energy and its cost relative to other commodities declined substantially. (See Figure 2.) Thus, there apparently was considerable incentive to make energy use more efficient through technological progress (without government involvement, by the way) even while energy became cheaper. Since the early 1950's, the energy consumption-to-GNP ratio has not changed much because of the compensating effects of several key variables that can be identified. Depending on one's reading of the future behavior of these variables, opinions differ on how much and how soon higher energy prices will reduce the energy consumption-to-GNP ratio. If this ratio were to drop rapidly now (after staying within a narrow band of 86,000 to 94,000 Btu per 1958 dollar for over 20 years), a satisfactorily high rate of economic growth could be maintained at a much lower rate of growth of energy consumption.

It is true that energy demand is price elastic. In our analysis we found that, over the period 1947 through 1974, total energy demand elasticity was -0.2 , which makes us hopeful that, at least over the near term, total energy consumption will continue to decline by 0.2 percent for every additional 1 percent increase in the deflated wholesale price of fuel and power. However, over the period 1947 through 1974, total energy consumption also increased with employment by nearly the square of the number of people in the civilian labor force who were actually employed. It also increased independently at a much lower rate with total population.

Consequently, when we look to the near-term future, we believe that energy consumption will rise nearly as rapidly as the deflated GNP in spite of further conservation-inducing increases in real energy costs, because of the increase in energy requirements associated with reductions in the current 9 percent unemployment level. For example, our studies (Table 1) tell us that, over the next 5 years, every 1 percent reduction in the projected unemployment levels toward the 4 percent "full-employment" level will increase energy consumption 1.6 quadrillion (10^{15}) Btu, or a little more than 2 percent of current consumption. This is equivalent to 1.6 trillion CF more natural gas per year (which is unavailable) or 800,000 barrels per day more oil (which is also unavailable domestically). In fact,

energy consumption-to-GNP ratios may increase temporarily because of the unpredictable impact of the many cyclical variables that affect this important parameter. Look at last year (1974)! Much was made of the 2.2 percent decline in primary energy consumption. However, real (deflated) GNP also decreased 2.2 percent, so that the ratio remained at about 89,000 Btu per 1958 dollar. Certainly, this was not conservation. Actually, the true picture may have been worse. Because energy costs increased so much in 1974, a substantial decline in the energy consumption-to-GNP ratio should have occurred. Therefore, the fact that the ratio remained constant probably means that there was enough loss of effectiveness of energy use in the economy to offset the energy savings induced by the sharply higher prices. In 1975, with much smaller energy price increases and a further sharp decline in real GNP, we could easily have a considerable increase in the energy-to-GNP ratio.

TABLE 1.—FUTURE UNEMPLOYMENT LEVELS AND ENERGY CONSUMPTION

Year	Unemployment percent		Increase in energy consumption	
	Fiscal year 1976 budget	Full employment	Quadrillion Btu or trillion cu. ft. of gas per yr	Equivalent million barrel of oil per day
1975.....	8.1	4.0	6.2	3.1
1976.....	7.9	4.0	6.0	3.0
1977.....	7.5	4.0	5.5	2.7
1978.....	6.9	4.0	4.6	2.3
1979.....	6.2	4.0	3.6	1.8
1980.....	5.5	4.0	2.5	1.2

Another line of reasoning that counters the argument that energy conservation will obviate the need for synthetic fuels is as follows: For many years, very close correlation has existed between annual per capita energy consumption and disposable per capita personal income. (See Figures 3 and 4.) Even though other factors would have to be considered in a complete analysis, the data for 1929 to 1974 clearly show that, regardless of energy prices, employment level, wartime or peacetime, boom, recession, or depression, when disposable personal income went up so did energy consumption in a quantitatively related way. And, when disposable personal income went down, so did energy consumption in the same quantitative way. Based on this relationship, which no doubt involves some counterbalancing of the effects of several variables, one may expect that a restriction in energy consumption, either by regulatory action or by a shortage of supply, is likely to lower real personal income through some combination of increased unemployment and reduced standard of living. In fact, this has already happened in 1974 and will probably again happen in 1975. We estimate that disposable personal income in 1975 will be about \$200 (1958) per capita less than in 1973. Our correlations tell us that just to get back to the 1973 level would take the equivalent of 4 to 4.5 trillion CF more (unavailable) natural gas in 1975 or over 2 million barrels per day of (by necessity) imported oil. Obviously, with existing limitations on the direct use of coal and the huge economic, financial, and environmental problems associated with providing amounts of energy of this magnitude in the form of electricity, a good case can be made for the urgently needed contribution of synthetic fuels.

COMPARISON OF TRENDS OF PER CAPITA ENERGY CONSUMPTION AND PER CAPITA DISPOSABLE PERSONAL INCOME

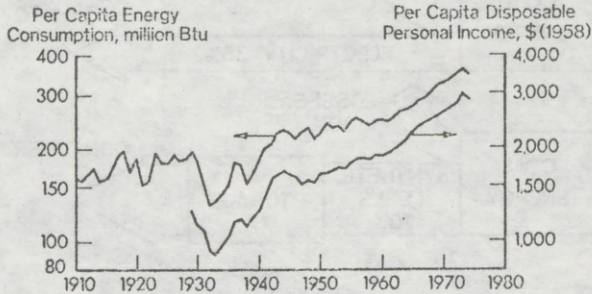


FIGURE 3

CORRELATION OF ANNUAL ENERGY CONSUMPTION PER CAPITA WITH DISPOSABLE PERSONAL INCOME PER CAPITA FOR THE UNITED STATES

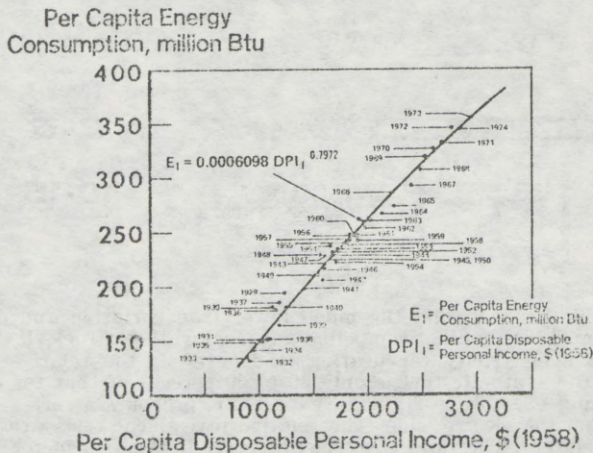


FIGURE 4

This brings us to the fourth point in favor of a meaningful synthetic fuels effort this time around: the economic advantage of continuing to meet most residential, commercial and industrial heat energy requirements with gaseous and liquid fuels rather than with coal- or nuclear-based electricity. Unfortunately, the credibility of the synthetic fuels option is under its heaviest attack by advocates of the electric solution for supplementing and, eventually, replacing domestic oil and natural gas uses. The issue here can be exemplified by a comparison of how the relative cost to the ultimate customer differs if a given coal supply is delivered to him in the form of electricity or in the form of synthetic pipeline gas. The arguments on both sides of this issue have been inconclusive because it is so difficult to arrive at truly comparable situations.

Speaking on behalf of synthetic fuels, I can show quite easily that, starting with the same coal source and taking advantage of the much higher conversion efficiency (see Figure 5), the higher load (operating) factor associated with a

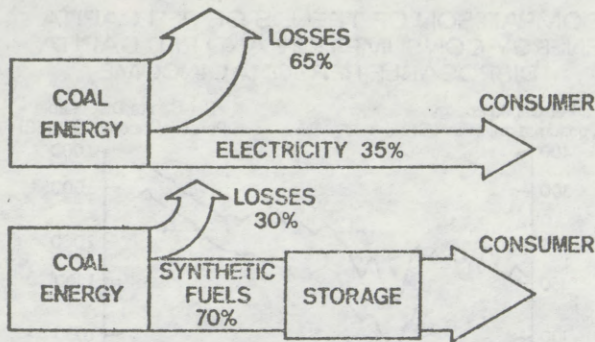


FIGURE 5

COST OF ENERGY TRANSPORT

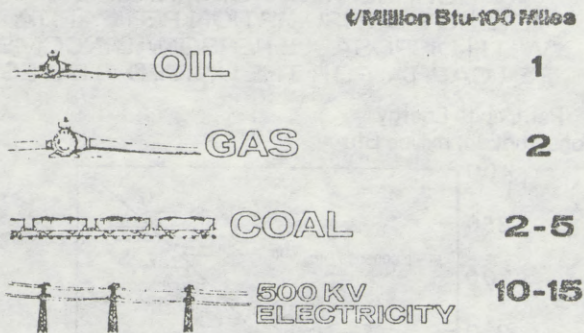


FIGURE 6

cheaply storable product, and the much lower transportation and distribution costs (see Figure 6), synthetic pipeline gas (or synthetic fuel oil) is a much better buy than electricity for heating loads even if the relative utilization efficiency for the synthetic fuel is only 50 to 60 percent of that for electric resistance heating. (See Table 2.) This, expectedly, provokes a series of counter-arguments from the electric side. The relative investment costs are questioned (more on that later). The validity of the difference in the load factor is attacked on the basis that much of the space-heating load would make use of off-peak power (the system capacity being determined by summer air-conditioning loads). And, most importantly, the electricity advocates cite the electric heat pump as a means to increase the efficiency differential to the point where electricity has a clear edge. This, in turn, leads to a response from the hydrocarbon fuel side to the effect that: (1) We don't believe your electric heat pump coefficients of performance, and we will have an even better gas heat pump soon; (2) you have to consider the added investment cost in the heat pump and its effect on relative energy costs; (3) you can't claim the use of off-peak power for space heating (with its attendant reduction incremental investment costs) when you justify

the higher investment cost of the heat pump by getting air conditioning for nothing, because this wipes out the off-peak power argument; etc., etc.

TABLE 2.—INCREMENTAL COST OF CLEAN ENERGY FROM COAL

	Pipeline gas	Electricity
Investment.....	^a \$2,000	^b \$450
Load factor (percent).....	90	60
Costs/10 ⁶ Btu:		
Fixed (20 percent of inv.).....	\$1.20	\$5.00
Fuel.....	^c .80	^d 2.50
Transportation.....	1.00	4.90
Total.....	^e 3.00	11.50

^a Per 10⁶ Btu-day.

^b Per kilowatt.

^c At 70 percent effective and \$0.55 per 10⁶ Btu for coal.

^d At 40 percent effective and \$1 per 10⁶ Btu for coal.

^e \$5 corrected for 60 percent utilization effective.

Obviously, then, a lot of detailed and objective systems studies will be necessary to get at the facts, region by region, and market by market. Much of the needed basic data is missing. It also seems of vital importance to separate the very laudable effort of the electric industry to defend the validity of the nuclear option from some of the missionary aspects of the all-electric economy crusade. The all-electric solution, when presented as an argument against synthetic fuels development, including hydrogen and other synthetics derived from nonfossil sources, loses much of its own credibility in the light of rapidly growing institutional and economic barriers to the resumption of preembargo electric expansion rates. Instead, we need a consensus that a prompt resumption of the expansion of our electric power supply is as essential to economic recovery and growth as is a growing supply of gaseous and liquid fuels from domestic sources.

Let us assume we have now demonstrated that synthetic fuels are needed and are probably economically viable. However, before we accept the credibility of a substantial role for synthetic fuels in future U.S. energy supply, several other issues have to be addressed. They include 1) the size and availability of the coal and oil shale resources as a function of allowable recovery costs; 2) the lead time and investment requirements to deploy commercial projects, and the impact of these requirements on the buildup of synthetic fuel production capacity; 3) the likely institutional barriers to commercialization of synthetic fuels; 4) the priorities for development of the various synthetic fuels including high-Btu gas from coal, low-Btu gas from coal, premium liquid fuels from coal (including methanol), liquid and solid boiler fuels from coal, and petroleum products and high-Btu gas from oil shale; and, finally, 5) the role of R&D in validating the synthetic fuels option by resolution of a substantial number of remaining technological, economic, environmental and institutional issues.

Obviously, it will be impossible to treat each of these areas in detail within the limited format of this paper. However, it will be instructive to look at some of the cost uncertainties, which are the major current issue in the defense of the credibility of the synthetic fuels option, and to trace the developments that led to President Ford's announcement of the goal of a 1 million barrel per day equivalent synthetic fuels capacity in his recent State of the Union address.

We have relatively good estimates of U.S. fossil fuel resources—those that are now technically and economically recoverable (i.e., proved reserves) and those that should be eventually recoverable. (See Table 3.) In terms of heating value, coal represents 75 to 80 percent of these resources. At a reasonable rate of introduction of nonfossil fuel sources, such as nuclear power and solar energy, and at a growth in energy consumption of 3 to 4 percent per year, our fossil resources should last for another hundred years. (See Table 4.) This should provide ample lead time to change over to a nonfossil fuel economy even if the current revisionist thinking on the magnitude of undiscovered oil and gas resources proves correct.

TABLE 3.—U.S. FOSSILE FUEL RESOURCES, DEC. 31, 1973

	Proved and currently recoverable 10 ¹⁸ Btu	Estimated total remaining recoverable 10 ¹⁸ Btu
Dry natural gas and natural gas liquids.....	0.3	1.6
Crude oil.....	.2	2.2
Coal.....	4.3	28.8
Shale oil and bitumens.....	.4	6.0
Total.....	5.2	38.6

TABLE 4.—LIFE OF U.S. FOSSIL FUEL RESOURCES AT VARIOUS ENERGY DEMAND GROWTH RATES

[Based on 1973 year-end estimates]

Annual growth rate	Date when remaining reserve production ratio drops to 10 yr		
	A	B	C
4 percent.....	1998	2042	2059
3 percent.....	2002	2058	2080
2 percent.....	2007	2080	2118

A—Proved Reserves (5.27×10^{18} Btu).B—Total remaining recoverable resources (38.6×10^{18} Btu).

C—Effective doubling of B resources with imports and nonfossil sources.

TABLE 5.—1985 U.S. ENERGY SUPPLY PROJECTIONS

[Quadrillion (10¹⁵) Btu]

	Pre-Embargo	Post-Embargo Acc. Supply	PLSB/bbl Acc. Supply	President's State of Union	CIAB
Coal.....	21.5	21.5	20.7	21.0	23.8
Oil.....	20.9	29.6	38.0	31.0	25.0
Gas.....	10.0	26.8	25.5	20.0	22.0
Hydro & Geo.....	4.0	4.0	4.8	4.0	3.7
Nuclear.....	21.0	21.0	14.7	13.0	16.5
Synthetics.....	2.0	8.5	0.4	2.0	2.7
Imports.....	34.0	8.4	0	9.4	14.0
Other.....	0	0	0	0	.3
Total.....	124.5	119.8	104.1	100.4	108.0

CONTRIBUTION OF VARIOUS SOURCES TO U.S. PRIMARY ENERGY CONSUMPTION, 1850-1973

[DATA IN 5-YEAR INTERVALS]

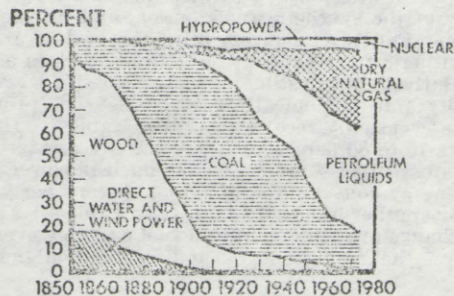


FIGURE 7

Unfortunately, the pattern of fossil fuel usage in the United States has developed in a manner contrary to present needs. (See Figure 7.) Whereas in 1850 more than 90 percent of U.S. primary energy was supplied by renewable resources (wood, water, and windpower), and at the turn of the century 75 percent was supplied by coal, now more than 75 percent is met by fuels with the smallest reserves—petroleum and natural gas. While maximum possible growth of nuclear power is absolutely essential, fossil fuels must continue to carry the major burden for the near to midterm. Obviously, coal must carry the largest part of this burden, and, for the least dislocation of the various energy markets—residential, commercial, and industrial—maximum feasible use must be made of synthetic fuels.

In the year following the oil embargo, a number of studies were made of U.S. energy demand and oil domestic supply capabilities. (See Table 5.) The projections coming out of these studies have varied widely in the size of the contribution expected from synthetic fuels. In the winter of 1973-74, IGT projected what the components of the 1985 U.S. energy supply would have been without the intervention of the embargo and, then, in view of the embargo, what a feasible 1985 fuel mix would be while making reasonable progress toward energy independence and maintaining desirable economic growth (about 4 percent per year). At that time, 8.5 quads of synthetics seemed attainable if immediate steps were taken to encourage the use of existing technology for production of high- and low-Btu gas and methanol from coal and for production of shale oil, and to accelerate the commercialization of available new technology for coal gasification and liquefaction. Unfortunately, much momentum has been lost in the year that followed.

One factor in the decline of synthetics has been the small credence given to them in some projections. Typical of such projections was the Project Independence report of the Federal Energy Administration (FEA), which was issued in the fall of 1974. Putting heavy reliance on such mechanisms as demand management—that is, shifting an unsatisfied demand for a fuel such as natural gas to electricity—and conservation, the report virtually wrote off synthetics, including only 0.4 quad in the 1985 mix. Of this, only 0.2 quad was expected to be pipeline gas from coal. This did not even recognize the plans already announced by the gas industry to construct six 250 million to 1 billion CF per day synthetic gas plants based on existing Lurgi technology on sites west of the Mississippi. (See Table 6). These plants would be privately financed and could be in operation by the mid 1980's. The output of these plants would be nearly 8 times the 0.2 quadrillion Btu projected by the Project Independence report.

TABLE 6.—ANNOUNCED COMMERCIAL HIGH-BTU COAL GASIFICATION PLANTS AND EXPANSIONS
[Lurgi gasification with methanation]

Site		Coal feed, tons/d	Plant output, million CF/d
El Paso Natural Gas Co.	Four Corners Area, N. Mex.	28,250	288
WESCO	Four Corners Area, N. Mex.	102,500	¹ 1,000
Panhandle Eastern Pipe Line Co.	Eastern Wyoming	25,009	270
Natural Gas Pipeline Co. of America	Dunn County, N. Dak.	² 108,500	¹ 1,000
American Natural Gas Co.	Beulah-Hazen Area, N. Dak.	³ 36,000	¹ 1,000
Northern Natural Gas Co., Cities Service Gas Co.	Powder River Basin, Mont.		¹ 1,000
Mid-1980's total			4,558

¹ 4 plants.

² 4 mines.

³ 1 plant.

Note: Oil equivalent 750,000 barrels per day.

TABLE 7.—PROJECTIONS OF 1985 MIX OF SYNTHETIC FUELS

	President's State of Union		CTAB		IGT ACC. supply	
	Million barrels per day	Quads or TCF	Million barrels per day	Quads or TCF	Million barrels per day	Quads or TCF
High-Btu gas from coal.....	0.7	1.4	1.0	2.0	1.0	2.0
Low Btu gas from coal.....					0.75	1.5
Methanol from coal.....					.3	.6
Distillate liquids from coal.....			.1	.2	.6	1.2
Clean boiler fuel from coal.....	.1	0.2			.6	1.2
Shale oil.....	.2	.4	.25	.5	1.0	2.0
Total.....	1.0	2.0	1.35	2.7	4.25	8.5

In view of the impetus already provided by industry, the potential contribution credited to synthetics in the President's State of the Union message and in the report of the Department of Commerce Technical Advisory Board, which were issued in January and February 1975, are more realistic. (See Table 7.) More importantly, they would at least provide the minimum necessary basis for the establishment of a viable synthetic fuels industry after 1985.

Although most announced commercial synthetic fuels projects are for high-Btu gas from coal, there is urgent need for prompt initiation of commercial projects for other synthetic fuels where proved technology exists (such as shale oil, low-Btu gas from coal, and methanol) even though the economics do not look favorable at this time. Otherwise, it will be impossible to reach President Ford's relatively modest goal of 1 million barrels per day equivalent of synthetic fuels capacity by 1985. This makes abandonment or delay of projects because of what now appear to be high costs especially unfortunate. Without such projects, no base for rapid expansion of a synthetic fuels industry will exist when the inevitable further sharp increases in world oil prices occur. The long lead times needed to massively deploy new technologies and the desperate need that we will eventually have for all synthetic products make it mandatory that all avenues of development be followed.

We are now in a very difficult period. Imminent shortages demand immediate actions in a climate of soaring cost estimates and raw material costs. These actions must be based on stable policies and clearly established priorities. Contributing to the difficulty is techno-economic information that is unreliable. Time and time again, advocacy estimates for one synthetic fuel, frequently based on incompletely developed technology and unrealistic assumptions of economy of scale, are compared with budget-type estimates of commercial plants based on fully developed processes. When this is compounded by inconsistent time bases, the resulting information, when it finds its way into government planning studies, can have unfortunate effects. The importance of the time basis during the recent period is shown by the now-abandoned Colony shale oil project whose cost reportedly escalated 78 percent between January and September 1974.

VARIATION OF SYNTHETIC FUELS PRICES WITH COAL PRICE *

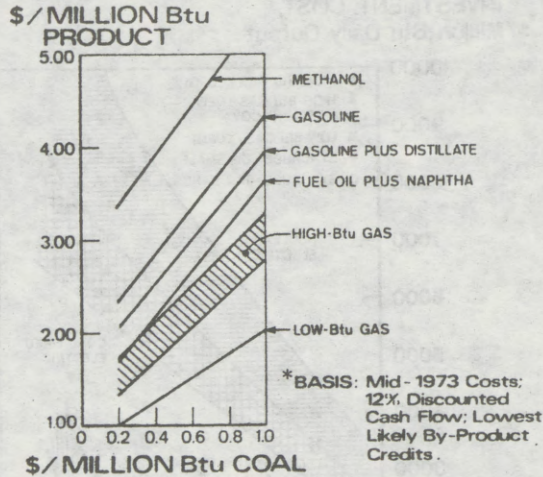


FIGURE 8

To provide a basis for more rational decisions on synthetic fuel options, IGT estimated synthetic fuel prices using consistent parameters and cost information as voluntary inputs to several government energy studies, such as the Project Independence report. (See Table 8 and Figure 8.) It is noteworthy that, far from having a substantial price advantage, a fuel oil-naphtha mix made by coal liquefaction has a price close to that of high-Btu gas made by the Lurgi Process. On the other hand, a fully refined product such as gasoline and distillate fuel oil made by coal liquefaction is substantially more expensive than high-Btu gas made by either Lurgi gasification or a new gasification technology.

CASE HISTORIES OF INVESTMENT COST ESCALATION

INVESTMENT COST,
\$/Million,Btu Daily Output

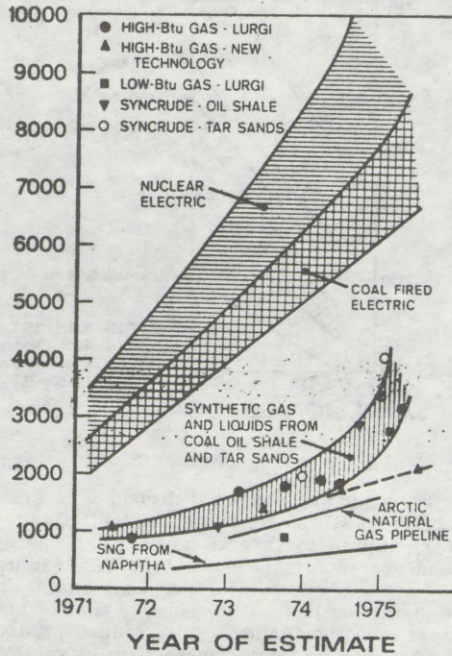


FIGURE 9

Synthetic fuels have recently gained much notoriety through widely published reports on the steep escalation of their costs. Wondering why this should be peculiar to synthetic fuels, we gathered cost information on a number of specific cases representative of energy systems planned to go onstream in the late 70's and early 80's. (See Figure 9 and Appendix A.) This information provides some interesting insights. The synthetic fuels projects do indeed show a sharp escalation over the past 1 to 2 years. However, the escalation in costs of nuclear plants, arctic pipeline projects, and SNG-from-naphtha projects has followed a similar pattern.

Also worth noting is what appears to be a lower rate of escalation for new technology. This may indicate that constantly improving technology can indeed counter rising costs.

TABLE 8.—COMPARISON OF INVESTMENT AND OPERATING COSTS FOR SYNTHETIC FUELS FROM COAL AND OIL SHALE
[Basis: mid-1973 costs, 12 percent discounted cash flow, lowest-likely byproduct credits]

	Coal						
	SNG		CSF process (Pittsburgh Seam Coal)				Oil shale (gas combus- tion process)
	Lurgi methanation, western coal	HYGAS, steam-oxygen, eastern coal	Gasoline	Gasoline plus distillate	Heavy fuel oil plus naphtha	Methanol (Koppers- Totzek/ICI)	
Total plant investment (including 10 percent contractor's overhead and profit and 15 percent contingency) ¹ dollars per million Btu-day	1,494	1,108	1,043	1,683	1,333	2,728	1,728
Total capital required (including interest during construction, start-up cost, and working capital) ² dollars per million Btu-day	1,983	1,484	1,402	2,252	1,805	3,595	2,236
Process efficiency, percent:							
Coal to desired product	56.2	61.5	59.7	42.3	44.8	40.0	260.0
Overall (including by-product credit)	71.5	66.1	66.9	62.3	67.8	41.1	362.5
Dollars per million Btu product:							
Coal cost (at 30 cents per million Btu)	0.53	0.49	0.50	0.71	0.67	0.75	
Direct operating cost less by-product credit ³	.25	.23	.21	.37	.22	.77	
Subtotal	.78	.72	.71	1.08	.97	1.52	0.60
Capital associated cost	1.15	0.87	0.82	1.49	1.32	2.10	1.31
Total	1.93	1.59	1.53	2.57	2.29	3.62	1.91
Liquid products from coal:							
Fuel gas							\$0.50/million Btu.
Butane							\$0.10/gal or \$0.91/million Btu.
Heavy fuel oil							\$7.00/bbl or \$1.17/million Btu.
Ammonia							\$25.00/ton.
Sulfur							\$10.00/LT.
Methanol from coal:							
Sulfur							\$10.00/LT.
Liquid products from oil shale:							
Butane							\$0.10/gal or \$0.91/million Btu.
Decant oil							\$0.10/gal or \$0.70/million Btu.
Ammonia							\$25.00/ton.
Sulfur							\$10.00/LT.
SNG from coal:							
(a) Lurgi:							
Tar, tar oil, naphtha							\$0.50/million Btu.
Phenol							\$0.04/lb or \$2.85/million Btu.
Ammonia							\$25.00/ton.
Sulfur							\$10.00/LT.
(b) HYGAS Steam-oxygen:							
Benzene							\$0.15/gal or \$1.13/million Btu.
Heavy oil							\$0.50/million Btu.
Sulfur dioxide							\$4.00/ton.
Ammonia							\$25.00/ton.
Sulfur							\$10.00/LT.

¹ Based on plant output excluding byproduct heating values.

² Excluding energy required for mining.

³ Excluding heat credit for coke.

⁴ Cost may increase to \$1.67 per million Btu if added air pollution controls are required.

⁵ Basis for byproduct credit:

TABLE 9.—WESCO COAL GASIFICATION PROJECT COST

[250,000,000 cubic feet per day high-Btu gas from subbituminous coal—initial operation 1979]

Estimate date	Project cost (millions)	Btu daily output (millions)
February 1973.....	\$406	\$1,624
June 1974.....	447	1,788
January 1975.....	853	3,412

TABLE 10.—NUCLEAR PLANT COSTS

[2,360 MWe Catawba, N.C. Station, 2,326 MWe Allens Creek, Tx. Station and 2,538 MWe Skagit, Wa. Station]

Estimate date	Completion date (2-units)	Plant cost (millions)	Btu daily output (millions)
July 1972.....	1978-79	\$699.4	\$3,624
August 1974.....	1980-82	1,198.4	6,307
September 1974.....	1981-83	1,555.3	7,480

Typical of the pattern of escalation for the synthetic fuel projects has been the experience of the Wesco coal gasification project. (See Table 9.) During the 2 years since the cost of the project was first estimated in 1973, the cost has more than doubled—most of the jump occurring in the last quarter of the period. It should also be recognized that a significant part of the cost increase is attributed to more definitive engineering. (See Appendix B.) Three comparable nuclear plants showed cost escalations similar to the Wesco project, more than doubling over a two-year period with especially high escalation during 1974. (See Table 10.) Cost estimates for coal-fired electric plants have followed a similar trend. Putting emphasis primarily on the escalation of synthetic fuels costs may give further impetus to referring the unsatisfied demand for hydrocarbon fuels to electricity. As noted before, this may place a large economic penalty on consumers compared with satisfying their energy needs with the direct use of hydrocarbon fuels from either natural or synthetic sources.

If we accept it as inevitable that the new energy supplies from secure sources needed to meet the demand for sound economic growth will cost substantially more than today's world oil price level, and that synthetics will not be singularly subject to this trend, the question is raised of how to best make these supplies, including synthetics, available in the most expeditious, efficient, and equitable manner. In recent months, we have seen a growing advocacy for modification of the free-market system to deal with the problems of equitable distribution of short energy supplies and of soaring energy prices. The premise that these problems can be dealt with better through government regulation than by the free market system finds little historical support.

When, in the 1800's, whale oil became scarce and its price soared to over \$100 per barrel, coal oil was devised as a cheaper and improved substitute lighting fuel. By the mid 1800's, the price of coal oil had climbed to \$30 to \$40 per barrel, not because of a shortage of coal, but because of rapidly rising demand. Again, the free market quickly responded with the development of technology to make kerosene from petroleum, an even better and safer lighting fuel than coal oil. Until then, petroleum was an unwanted waste sometimes encountered in salt wells. In 1859, the first oil well was completed. In just four years, crude oil production rose to 3 million barrels per year, and the price of oil dropped to 10 cents per barrel.

There are numerous other examples of the classic interaction of the marketplace, technology, and private enterprise successfully responding to raw material supply problems. When the demand for silk exceeded its supply and costs became prohibitive for even the well-to-do, first rayon and then nylon and other far superior synthetics were developed. Likewise, we have seen detergents replace soap, synthetic rubber replace natural rubber, and plastics and aluminum replace steel, providing the marketplace with an abundance of often superior raw materials at much lower cost. To accept the view that, when there is a shortage

in a basic commodity, the best answer is to equitably allocate the shortage through actions outside of the market place means that we are denying the evidence of the success of the market system in efficiently solving such problems at what is, in the long run, the lowest cost to the consumer.

In regard to energy, I must take issue with the premise that the demand for energy will inevitably outrun supply and that the market system is unable to respond in time to what may be its greatest challenge to date. The only evident energy shortage we now have in the United States is that of natural gas. Here, we clearly have a situation where, instead of placing reliance on the market system with price as an indicator, the opposite approach was taken and has demonstrably failed. In contrast with the success of the market system in providing abundant and cheap supplies of such commodities as textile fibers, natural gas regulation is a classic example of how not to achieve efficiency and equitable distribution. With all the fossil fuels remaining throughout the world—enough to support world energy demand growth at a rate of 4 to 5 percent per year for the next 80 years or so—and with all of the uranium, thorium, and deuterium that is available in the earth's crust and in the oceans, and as long as the sun continues to shine, there is absolutely no need for energy supply deficiencies. Wherever they occur, they will most likely be the result of not placing primary reliance on the market system to achieve efficiency and equitable distribution.

In the case of energy, which, with the exception of food and clothing, is the most vital and basic of all commodities, there is, of course, a role for government. Government can assist when sudden dislocations occur as a result of interference with the market system from whatever quarter. The function of government in such a case should not be to institutionalize shortages but to moderate the impact of the inevitable time delay before market forces can act effectively to bring forth alternative sources of supply. Obvious current examples are policies that increase incentives for domestic exploration and development of gas and oil and that will make it possible to create a synthetic fuels industry in the face of expected costs of synthetic fuels substantially in excess of the current prices of imported oil.

I would like to elaborate just a bit on the last point. The major barrier to moving ahead with a commercial synthetics industry is really the uncertainty of the situation as viewed by the investor. Various policy options open to the Federal Government can have a major and sometimes unforeseen impact on this uncertainty. For example, a key role will have to be played by the Federal Power Commission in utilizing the available regulatory machinery to ensure that the investors in interstate synthetic pipeline gas from coal projects will recover their investment through rates paid by the ultimate customer even if, due to uncontrollable circumstances, actual costs are substantially higher than originally projected. In this regard, the singling out of supplemental sources of pipeline quality gas as a target for incremental pricing further adds to investor uncertainty because the impact of high synthetic fuel costs would be greatly magnified. No such suggestion has been made for high-cost electric power supplies from new nuclear or fossil fuel plants when added to supplies of low-cost power from existing sources. Historically, rolled-in-pricing—that is, averaging the price paid for supplies from all sources—has been the rule in the utility industry. Incremental pricing was meant to ensure correct allocation of high-cost new supplies to those customers willing to pay the higher price. However, in the real world of continued shortage, the role of supplements for natural gas is not to serve the incremental customer but to maintain a level of energy supply necessary for the total economic health of a given service area.

Regulatory treatment which properly recognizes and assigns the risks of synthetic fuels projects will not only be an essential prerequisite in the establishment of a high-Btu pipeline gas from coal industry but will also be necessary for introduction of synthetic boiler and turbine fuels (such as low-Btu gas, solvent-refined coal, and methanol) by the regulated electric utility industry. There are, of course, many other mechanisms to increase investor confidence in synthetic fuels. Many proposals have been put forth by various Executive agencies and departments and in Congress to encourage the development and commercialization of synthetic fuels above and beyond the legislation already on the books. They include such mechanisms as government purchase of specified quantities of synthetic fuels at price levels which reflect their true cost; construction

of synthetic fuels plants by the government, on sites adjacent to reserves owned by the government, for leasing to private interests at rates commensurate with the existing market price of competitive fuels and provision for purchase of such facilities and reserves by the operator after the plant has proved to be profitable; government guaranteed construction loans and long-term debt for synthetic fuels plants; and many more.

I am confident that it will be possible to develop policies for assisting the free market system in the development of a viable synthetic fuels industry in the United States at a cost to the tax payer and consumer that is defensible and clearly in the public interest. I am equally confident that events in the not-too-distant future will confirm the prudence of those who, in these times of considerable uncertainty, have put their faith in the credibility of the synthetic fuels option.

APPENDIX A

CASE HISTORIES OF INVESTMENT COST ESCALATION FOR ENERGY SUPPLY FACILITIES

Type of plant or facility and estimate date	Completion Date	Capacity	Cost (millions)	Cost per million Btu daily output
Synthetic fuels:				
High-Btu gas, Lurgi (El Paso):				
August 1971	1976	288,000,000 ft ³ /d	\$250.0	\$868
October 1973	1978	288,000,000 ft ³ /d	491.0	1,705
High-Btu gas, Lurgi (Wesco):				
February 1973	1979	250,000,000 ft ³ /d	406.0	1,624
June 1974	1979	250,000,000 ft ³ /d	447.0	1,788
January 1975	1979	250,000,000 ft ³ /d	853.0	3,412
High-Btu gas, Lurgi (American Natural Gas):				
March 1974	1980	250,000,000 ft ³ /d	450.0	1,800
April 1975	1980	250,000,000 ft ³ /d	*778.0	3,112
High-Btu gas, HYGAS (IGT):				
Mid 1971	1980	250,000,000 ft ³ /d	287.0	1,148
Mid 1973	1980	250,000,000 ft ³ /d	351.0	1,404
Mid 1974	1980	250,000,000 ft ³ /d	440.0	1,760
April 1975	1980	250,000,000 ft ³ /d	530.0	2,120
Low-Btu gas, Lurgi (Commonwealth Edison):				
October 1973		(900 to 1,100,000,000 ft ³ /d.)	521.0	814
February 1975		(4 plants—160 Btu/ft. ³)	1,700.0	2,656
SNG from naphtha (Transco):				
March 1972	1976	250,000,000 ft ³ /d	85.0	340
April 1975	1976	250,000,000 ft ³ /d	170.0	680
Syncrude-oil shale (Colony):				
Late 1972	1978	50,000 bbl/d	300.0	1,034
January 1974	1978	50,000 bbl/d	450.0	1,552
September 1974	1978	50,000 bbl/d	800.0	2,759
Syncrude-tar sands (Canadian):				
January 1974	1978	125,000 bbl/d	1,400.0	1,931
February 1975	1978	125,000 bbl/d	2,910.0	4,014
Arctic natural gas:				
Canadian arctic gas and Alaskan arctic gas pipeline:				
January 1973	1979	4,500,000,000 ft ³ /d	4,000.0	889
March 1974	1979	4,500,000,000 ft ³ /d	5,700.0	1,267
February 1975	1979	4,500,000,000 ft ³ /d	6,880.0	1,531
Nuclear electric power:				
Duke Power Co. (Catawba, N.C.): July 1972	1978-79	2,360 MWe (2 units)	699.4	3,624
Houston P. & L. Co. (Allens Creek, Tex.): August 1974	1980-82	2,326 MWe (2 units)	1,198.4	6,307
Puget Sound P. & L. Co. (Skagit, Wash., Station): September 1974	1981-83	2,538 MWe (2 units)	1,555.3	7,480
Kansas City P. & L. Co. (Wolf Creek Station): May-July 1975	1982	1,150 MWe	948.8	10,073
Northwest Utilities Co. (Pilgrim Station): May-July 1975	1982	1,180 MWe	1,244.9	12,882
Consumers Power Co. (Midland, Mich.): May-July 1975	1981-82	2,556 MWe (2 units)	2,796.3	13,358
Philadelphia Electric Co. (Limerick Station): May-July 1975	1981-83	2,110 MWe (2 units)	2,004.5	11,600
Philadelphia Electric Co. (Fulton Station): May-July 1975	1984-86	2,320 MWe (2 units)	2,452.2	12,906
Long Island Lighting Co. (Lanesport Station): May-July 1975	1982-84	2,300 MWe (2 units)	1,851.5	9,829

See footnote at end of table.

APPENDIX A—Continued

CASE HISTORIES OF INVESTMENT COST ESCALATION FOR ENERGY SUPPLY FACILITIES—Continued

Type of plant or facility and estimate date	Completion Date	Capacity	Cost (millions)	Cost per million Btu daily output
Coal-fired electric power:				
Ohio Power: March 1971		1,300 MWe	2, 44. 4	2, 295
Power Engineering estimate: June 1972		800 MWe	260. 0	3, 968
Central Illinois Light Co. (Duck Creek): October 1974	1982	600 MWe	403. 2	8, 205
Detroit Edison (Bell River): April 1975	1982	697 MWe	467. 7	8, 193
Consumers Power Co.: April 1975	1983	800 MWe (L.S. coal)	410. 0	6, 258
Consumers Power Co.: April 1975	1983	800 MWe (H.S. coal)	520. 0	7, 937
Tucson Gas & Electric (San Juan): May-July 1975	1981	466 MWe	288. 9	7, 570
Dayton Power & Light (East Bend): May-July 1975	1980-82	1,200 MWe (2 units)	633. 6	6, 447
Dayton Power & Light (Killen): May-July 1975	1981-83	1,200 MWe (2 units)	679. 2	6, 911
Arizona Public Service Co. (Kirparowitz): May-July 1975	1981-84	3,000 MWe (4 units)	2, 178. 0	8, 864
Indianapolis Power & Light: May-July 1975	1982-84	1,300 MWe (2 units)	726. 7	6, 825

* Does not include capitalized interest during construction which is provided for on a current basis through a surcharge on Michigan Wisconsin Pipe Line Co. sales.

APPENDIX B

WESTERN GASIFICATION CO. (WESCO) COAL GASIFICATION PLANT, COMPARISON OF COST ESTIMATES

[All figures in thousands of dollars]

Description	January 1975 estimate	Mid-1973 estimate	Cost difference	Source of difference	
				Definitive engineering	Escalation
1. Process units	276, 284	146, 756	129, 528	34, 028	95, 500
2. Utility units	196, 317	96, 357	99, 960	52, 107	47, 853
3. Offsite units	105, 709	46, 451	59, 258	34, 858	24, 400
4. Water pipeline	9, 084	12, 599	(3, 515)	(5, 785)	2, 270
5. Catalyst and lube oils	6, 750	2, 802	3, 948	1, 659	2, 289
6. General plant	2, 356	1, 301	1, 055	0	1, 055
Subtotal	596, 500	306, 266	290, 234	116, 867	173, 367
Sales tax	22, 250	11, 375	10, 875		
Engineering fee, licenses	39, 501	21, 595	17, 906		
Startup costs	4, 875	3, 925	950		
Subtotal	663, 126	343, 161	319, 965		
10 percent contingency	66, 312	34, 316	31, 996		
Total	729, 438	377, 477	351, 961		
Plant cost	596, 500	306, 266	290, 234		
Sales tax, fees, and startup	66, 626	36, 895	29, 731		
10 percent contingency	66, 312	34, 316	31, 996		
Plant cost total	729, 438	377, 477	351, 961		
Gas pipeline	25, 818				
Allowance for funds used during construction ¹	97, 604				
Total	852, 860				

¹ Computed on basis of prior financing assumptions; actual financing cost yet to be determined.

EXHIBIT 2

COMPARISON OF COAL-BASED RESIDENTIAL SPACE HEATING COSTS

	Synthetic gas (dollars per 10 ⁶ Btu)		Electricity (cents per kilowatt-hour)	
	Replacement ^a	Growth	Replacement ^b	Growth
Capital investment.....	\$850×10 ⁶ per 250×10 ⁶ ft ³	\$850×10 ⁶ per 250×10 ⁶ ft ³	No capital charges are assessed based on the electric utility's ability to supply some increment of off-peak power	\$650/kW ^c
Annual capital charge ^d	\$127.5×10 ⁶	\$127.5×10 ⁶		\$97.50/kW
Effective utilization.....	90 percent	90 percent		65 percent
Capital charges.....	1.63	1.63		1.71
Fuel.....	^e .89	.89	^f 1.36	^g .95
Operation and maintenance.....	^h .09	.09	ⁱ .13	^j .19
Total, production cost.....	2.61	2.61	1.49	2.85
Transmission, distribution, cost of service, etc.....	^k .10	^l 1.14	^m .15	ⁿ 1.58
Storage.....		.16		
Total, delivered cost.....	2.71	3.91	1.64	4.43
Space heating system investment ^o		2.64	.25	1.80
End-use efficiency, percent ^p	60	75	100	273
Cost of useful heat, per 10 ⁶ Btu.....	4.52	7.85	5.54	10.03

^a Replacement of the declining supply of natural gas with synthetic gas from coal or off-peak electricity.

^b Based on the highest estimate filed for a high-Btu Lurgi coal gasification unit. More recently, costs have been unofficially estimated as high as \$1,000,000,000, which would add about \$0.29/million Btu to the capital charges.

^c The costs are based on utility estimates as reported to State regulatory commissions and the Securities and Exchange Commission.

^d Annual capital charges of 15 percent on initial capital investment is roughly equivalent to the capital charges based on the utility financing method taken from Supply-Technical Advisory Task Force-Synthetic Gas-Coal, Final Report, prepared by Synthetic Gas-Coal Task Force for the Supply-Technical Advisory Committee, National Gas Survey, Federal Power Commission, Apr. 1, 1973. This method defines rate base as equal to book value after depreciation plus working capital. Factor inputs are: 20-yr project life, 5 percent straight-line depreciation of fixed investment, 48 percent Federal income tax, 75/25 debt-to-equity ratio, 15 percent return on equity and 9 percent interest on debt.

^e Fuel charges for synthetic gas plants are based on a mine-mouth coal price of \$0.50/million Btu. The plant itself is a mine-mouth installation that assumes ample availability of water and a 56 percent coal-to-gas efficiency of operation (i.e., excludes credit for by-products).

^f Fuel charges for the replacement case assume all additional load is to be borne 60 percent by coal-fired units and 40 percent by oil-fired units. Fuel prices are the average coal and oil prices reported by utilities to the Federal Power Commission in March of 1975.

^g Fuel charges for the growth case are based on \$1/million Btu coal delivered to the power plant and a thermal efficiency of 36 percent.

^h Operation and maintenance expenses reflect a \$35,000,000 credit for by-products produced in the gasification operation.

ⁱ Operation and maintenance costs for the replacement case are assumed to be 35 percent fixed and 65 percent variable. Only the variable portion was considered. In computing operation and maintenance expenses it was further assumed that the average 1974 load factor increased from about 47 percent to about 66 percent. The basic data were taken from the "1973 Edison Electric Institute Statistical Yearbook."

^j The growth case assumes full operating and maintenance expenses as calculated for the investor-owned utilities using the "1973 Edison Electric Institute Statistical Yearbook" data and escalated by an annual increase of 5 percent from mid-1973 to mid-1975.

^k Transmission and distribution costs are unescalated costs, which include only those operating expenses directly related to moving gas through the pipeline. They are based on 1973 data for the investor-owned gas utility industry taken from the American Gas Association's "Gas Facts."

^l The growth case uses average 1973 transmission and distribution costs taken from the American Gas Association's "Gas Facts" and escalated by a 5 percent annual charge from mid-1973 to mid-1975.

^m The replacement case uses the investor-owned electric utility operating expenses allocable to transmission and distribution alone. The data are taken from the "1973 Edison Electric Institute Statistical Yearbook."

ⁿ Transmission, distribution, cost of service, etc., is the difference between average residential revenues per kilowatt-hour and the average cost of production for investor-owned electric utilities. The average residential revenues per kilowatt-hour are given in the "1973 Edison Electric Institute Statistical Yearbook". The average production cost is a computed figure arrived at by adding average variable production costs as given in the above reference and estimated capital charges (fixed charges). These fixed charges are calculated by allocating 45 percent of net total electric utility plant assets to generation plant and multiplying it by the 1973 embedded capital cost of just over 12 percent. The fixed and variable costs are then combined and allocated over energy sales for investor-owned utilities in 1973. The differential resulting from the subtraction of production cost from average residential revenues per kilowatt-hour is then escalated at a 5 percent annual rate from mid-1973 to mid-1975.

^o The space-heating system investment cost is assumed to be nil for the replacement gas case and \$1,800 for the growth gas case. The replacement electricity investment cost is \$500 and the growth electricity investment cost is \$4,808. The growth electricity cost assumes a heat pump installation with a 10-year life for the pump portion of total costs. The original installation cost is combined with the present value of the unescalated pump portion of investment after 10 years. The heat pump cost is further reduced by allocating only 75 percent of its total cost to heating. All investments are assumed to be financed at a 9 percent annual rate over a 20-year period. Cost figures are based on "A Regional Comparison of Energy Resource Use and Cost to Consumer of Alternate Residential Heating Systems," November 1974, by J. G. Delene of the Oak Ridge National Laboratory.

^p End-use efficiencies are generally accepted numbers with the exception of the heat pump coefficient of performance that was calculated for a 4-ton installation in Columbus, Ohio.

NATURAL RESOURCES DEFENSE COUNCIL, INC.,
Washington, D.C., September 17, 1975.

Hon. OLIN E. TEAGUE,
Chairman, House Committee on Science and Technology, Room 2317 Rayburn
Building, Washington, D.C.

DEAR MR. TEAGUE: I am responding to your letter requesting comments on H.R. 3474 which, as amended by the Senate, *inter alia*, provides the Administrator of the Energy Research and Development Administration (ERDA) with authority to guarantee loans for commercial development of synthetic fuels. The outstanding indebtedness that may be guaranteed under the bill may not exceed \$6 billion.

This authority was not part of H.R. 3474 as it was passed by the House on June 20, 1975. On July 22, 1975, without hearings, the Senate Committee on Interior and Insular Affairs amended the Senate bill, S. 598 (the Senate counterpart of H.R. 3474) and added this loan guarantee authority as section 103. Accordingly, neither the Senate nor the House have held hearings on the \$6 billion loan guarantee program for commercial development of synthetic fuels.

This loan guarantee program would involve a substantial amount of federal funds. This fact alone counsels against consideration of the bill without benefit of public hearings. In addition these funds would primarily be used to encourage accelerated commercial development of energy production processes which could have substantial environmental and socio-economic impacts. The Congress should hold public hearings on the proposed legislation to study these important issues prior to considering enactment of the bill.

Among the more important factors that need to be examined are the following:

1. The program would provide federally guaranteed loans to encourage commercial development of oil from coal and shale. Whether additional direct federal support in this area is needed beyond that already being provided by existing programs, including the Department of Interior's Prototype Oil Shale Leasing Program and existing synthetic fuels development programs under ERDA, should be carefully examined. Similarly, careful consideration should be given to alternative federal assistance methods, such as price supports, as well as other legislative approaches, such as price decontrols.

2. The program would seek to provide an industrial base capable of producing one million barrels of oil per day from coal and shale. It is questionable whether this is an appropriate goal. For example, the Administration's Interagency Task Force on Synthetic Fuels believes that a fully committed synthetic fuels commercialization program of one million barrels per day is not justifiable at this time. Whether it is necessary to accelerate commercial production of synthetic fuels at all and, if so, to what level needs to be carefully analyzed.

3. The program would require substantial public and private investments in the facilities and services (infrastructure) which would be necessary to meet the needs of the large number of people who would work and live in the production areas. These areas would most likely be in the essentially unpopulated or rural areas of Colorado, Utah, Wyoming, Montana, North Dakota, South Dakota, Nebraska, and New Mexico, where almost all of the nation's oil shale reserves are located and where substantial coal reserves exist. Whether the necessary infrastructure, including new towns, could be provided in the brief time available needs to be examined. It is also important to assess carefully the social costs involved in accelerating commercialization of synthetic fuels.

4. The program would involve substantial commitment of federal funds to existing synthetic fuels production technologies. The non-nuclear part of ERDA's budget would provide substantial federal money for research and development of new and more efficient methods of producing oil from coal and shale. It may be that the loan guarantee program would result in commercialization of inefficient and environmentally destructive technologies and might result in substantial waste of federal funds. These issues should be thoroughly analyzed.

5. The proposed program (Section 103) does not require that information and technological advances developed by the program be disseminated or made available to the public.

In sum, there are a number of extremely important issues involved in the \$6 billion synthetic fuels commercialization loan guarantee program which have not been considered in public hearings and have not been subjected to careful

scrutiny. Public hearings to examine these issues should be held before the proposed legislation is considered.

I hope these comments are helpful and responsive to your request.

Sincerely yours,

EDWARD L. STROHBEHN, Jr.

TELEGRAM

SEPTEMBER 18, 1975.

On several occasions I have had the opportunity to testify before committees of the Congress on suggestions to help create a measure of energy independence for our Country. Since the production of synthetic and substitute fuels has been recognized by the Congress as a viable solution, I strongly urge your support of H.R. 3474, the ERDA Authorization Bill. The Senate version of this bill, particularly Section 103, authorized specific Federal support programs that will permit joint government and industry development of synthetic fuels technology. I strongly urge its inclusion. Without these specific loan guarantees and financial support, industry will be unable to bring available synthetic fuel technology to a demonstration stage, and thereby further delay the Country's goal of producing the equivalent of at least one million barrels of oil per day. The need for your positive action on alternate energy development is now, and I urge your support and inclusion of government guarantees in H.R. 3474.

FLETCHER L. BYROM,

Chairman, Koppers Company, Inc.

Sent to 13 House members of Joint Committee on September 11, 1975.

MARCH 14, 1975.

COAL GASIFICATION: NEGLECTED RESPONSE TO AMERICA'S ENERGY NEEDS
SUBMITTED BY KOPPERS COMPANY, INC.

For further information please contact: Robert G. Wilson, Vice President, Koppers Company, Inc., Pittsburgh, Pa. 15219.

SUMMARY

President Ford has said that the nation needs a program of Federal incentives to ensure that we can produce the equivalent of one million barrels of synthetic fuels per year by 1985. To help accomplish this he called for 20 new synthetic fuel plants in the next decade.

Robert C. Seamans, Administrator of the Energy Research and Development Administration, says that the President's objective is attainable if the government will promulgate a plan including front-end price support and a purchase guarantee.

Industry must be convinced, moreover, Dr. Seamans asserts, that government not only is believable but that it can deliver.

With the United States sitting on one-half of the world's coal reserves, coal gasification clearly is the quickest route to fulfillment of the President's goal.

Industry is ready now to deliver commercial-sized environmentally innocuous coal gasification plants which can use any coal as feed stock regardless of sulfur content.

The generally-held assumption that commercial scale coal gasification for industry requires further technological development is without basis. Fourteen plants using just one of the commercially available processes (Koppers-Totzek) are now in operation in Europe, the Mid-East, Africa and India.

Currently in the United States there are utilities, manufacturing companies, chemical producers and metals manufacturers using critically short natural gas who are ready to build coal gasification plants.

At current and projected market prices of other energy forms these plants are economically viable.

But industry will not commit capital funds to these plants—and to materially contribute to a solution of the nation's energy problem—for fear that political factors could drop the cost of oil to a point which would render gas from coal uncompetitive.

This is a factor beyond the control of industry. It is, therefore, a problem requiring government intervention.

This intervention by government must assure that gas yielded from coal will not be significantly more costly to consumers than the energy generated by imported fuel or other sources.

If the President's goal is to be met this problem must be confronted by government now.

New plants can be brought on stream in three years. That's three years from the time government provides the assurance to permit industry to proceed.

These assurances must be an integral element in any rational energy policy. When, in Dr. Seaman's words, the government "delivers," industry will deliver the plants.

Particularly for the East and Northeast where shortages are greatest and, coincidentally, coal is readily available, the coal gasification solution will bring early relief without environmental sacrifice.

INTRODUCTION

Coal gasification is not a new technology. Prior to World War II it provided much of this nation's gas requirements for heating, cooking and industrial applications. After the war, however, gas producers who had served a major portion of the United States phased out as plentiful supplies of low-cost natural gas were distributed through a nationwide pipeline system.

However, while interest in coal gasification in the United States dwindled with the advent of plentiful cheap natural gas, Europe's interest in gasification grew because it was not similarly blessed. With its increased interest, Europe refined and improved the processes. Still later, even Europe shifted its principal interest from gasification of indigenous coal to cheaper, imported hydrocarbons.

Today, the situation has changed. The spiraling cost of petroleum energy in all its forms is fast erasing the price differentials between coal gas and other sources. Interfuel competition is becoming a thing of the past as all sources must be exploited if the United States is to have any hope of attaining a high level of energy independence by 1985.

U.S. production of natural gas has not kept pace with demand, even though 23 trillion cubic feet was produced in 1974. The Federal Power Commission estimated that during the winter months of 1974-75, the 42 major U.S. interstate pipelines would fall short of their contracted deliveries to industry by an average of 11 percent. This would be a 60 percent jump over the 1973-74 short fall figures.

When natural gas allocations must be reduced, most suppliers use a priority list favored by the FPC. Lowest-priority users are industrial customers with interruptible contracts and with boilers equipped to use alternative fuels (usually oil or liquefied petroleum gas). Next to be cut off are industrial users with non-interruptible contracts with boilers equipped to use alternative fuels. Next are the ammonia plants producing fertilizer. Then come commercial users. The highest priority goes to houses and other residential structures.

Grim as it is, this is only the beginning. Even under the most optimistic assumptions of National Petroleum Council studies, U.S. production will reach only 32 trillion cubic feet by 1985. Demand will have soared to 39 trillion cubic feet.

Thus, our "mini-crisis" of this comparatively mild winter may be only the first of an annual more critical series as the gap between supply and demand continues to widen.

These increasing threats of natural gas shortages and the abundance of U.S. coal reserves¹ has led to a mounting interest in coal gasification. This is reflected in the U.S. government's current financing of some 20 pilot plant projects. It is estimated that any commercial processes stemming from these pilot projects may be as much as 15 years away and it is conceded that the experimental processes under test may not prove practical.

These developmental efforts seek processes for pipeline quality (1,000 Btu) gas. However, low and medium Btu technology, adequate to meet the gas needs of industry and utilities and thus free natural gas for pipeline uses, is not in the developmental stage. It is perfected and operating successfully and extensively in commercial plants abroad.

COAL GASIFICATION'S POTENTIAL APPLICATIONS

Industries and utilities consume 67 percent of the total natural gas used today, with the remaining 33 percent going to residences and commercial operations.

¹ 433.9 trillion tons against normal present consumption of 613.8 million tons.

Coal gasification can make a significant immediate contribution in the combined industrial and utility markets which account for two-thirds of the nation's gas demand.

The specific applications in which coal gas can be used instead of natural gas are:

As an industrial fuel for combustion in heating furnaces and for varied heat-treating processes.

As an energy source for electrical power generation.

As synthesis gas to be used as feedstock: for ammonia, a major chemical that now consumes vast quantities of natural gas for the manufacture of fertilizers; for methanol, another high-volume chemical product; and for other hydrocarbon-based chemicals.

The steel, automotive, nonferrous metals, glass, rubber, cement, foundry, utility and chemical industries can use coal gas on a large scale. All of these industries can readily convert to a substitute gas. This will release large amounts of gas for light industrial, commercial and residential applications.

In terms of the over-all U.S. energy interests, the mathematics of such conversions is extremely significant. One moderately small K-T gasifier, for example, could produce an energy equivalent sufficient to service about 20,000 average six-room homes in a climate such as Pittsburgh's. Thus, spread over a broad spectrum of industrial/utility applications, coal gasification technology could have an enormous impact upon the nation's energy picture.

The advantages of coal gasification have not gone unnoticed by potential users of the technology. During the oil embargo, interest in the process ran particularly high. The Koppers Company in fact was called upon to do engineering studies, make plans, survey sites and do all preliminary groundwork for a number of prospective customers for K-T plants. With the lifting of the embargo, however, their interest plummeted because potential users of coal gasification: fear they will be put in a competitive disadvantage in going to such expense while others may continue to draw from regulated natural gas sources, must plan for the possibility that oil prices will be lowered in the future, again making gas from coal noncompetitive, are uncertain about U.S. policy on imports, must take into account the unclear future of environmental legislation and possible relaxation of air quality standards.

Energy users therefore continue to look to liquefied petroleum gas and petroleum for energy—ultimately meaning more imports and a worsening of our balance-of-payments problems. And the disparity between natural gas requirements and supply continues to widen.

DESCRIPTION OF K-T PROCESS

In the Koppers-Totzek process, pulverized coal, oxygen and steam are fed into a gasifier where they react in suspension at high temperatures.

The gasifier is a refractory-lined steel shell equipped with a stream jacket.

A two-headed gasifier can gasify more than 400 tons of coal per day. The coal, oxygen and steam are brought together in opposing burner heads spaced 180° apart. Four-headed gasifiers, capable of gasifying 850 tons of coal a day, employ burner heads 90° apart. With the use of multiple units, capacities and efficiencies can be greatly increased.

Within the gasifier, the operating pressure is slightly above atmospheric and the reaction temperature is 3,300–3,500° F. The coal is gasified almost completely and instantaneously, and organic contaminants are destroyed to trace quantities.

K-T can gasify all ranks of coal. High sulfur and ash present no problems. Actually, any carbonaceous material that can be dried and pulverized is a suitable feedstock.

The process is virtually pollution-free. At the prevailing operating temperatures, no tars, phenols or other condensable hydrocarbons are formed—only gaseous products. Sulfur in the coal is converted to hydrogen sulfide in the gasifier. The hydrogen sulfide is removed and converted to elemental sulfur through commercially proved processes. This contrasts sharply with the direct firing of coal in a boiler, where the sulfur in the coal is converted to sulfur dioxide, which is difficult to remove from stack gases.

Because the sulfur in coal presents absolutely no environmental problems in the use of the K-T process, the technology could be applied to tap the vast reserves

of high-sulfur coal, such as Illinois No. 6, currently unsuitable for many applications under Environmental Protection Agency standards.

There are no solid waste problems associated with the K-T process. About 50 percent of the coal ash particles fuse and drop out as slag into a slag quench system below the gasifier. The remaining inert ash particles are carried out of the gasifier as a fly ash mingled with the unburned carbon and are removed downstream. Used as landfill, the slag is more inert than the ash associated with the original coal *in situ*.

The product obtained from K-T is a clean, desulfurized, medium-Btu gas having a heating value of about 300 Btu's per cubic foot (compared with 1,000 Btu's for natural gas).

This gas is becoming a more and more acceptable alternative to natural gas as energy costs continue to escalate. Some industrial consumers are now paying up to \$2 per million Btu's for natural gas delivered to their plants. A moderately sized six-gasifier K-T facility to supply industrial fuel gas would produce the equivalent Btu value of 66 million cubic feet of natural gas per day at comparable costs (as calculated by the FPC Utility Financing Method). The construction cost of the facility itself would approximate \$100 million.

CONCLUSIONS

Collectively, the roadblocks to the implementation of coal gasification projects are having a considerable negative effect on the nation's energy picture.

Clearly, coal gasification as a source of energy will remain dormant until a definitive, comprehensive, national energy policy emerges that recognizes the positive contribution coal gasification can provide to our nation's energy producing capabilities. This recognition must be solidly reinforced with a program to provide the direction and incentives that will stimulate coal gasification's adoption.

The U.S. government has proposed policies calling for tariffs on imported petroleum and taxes on domestic production. It seems appropriate that part of the large sums these policies would produce should be plowed back into development of energy supplies from such commercially proved, non-polluting sources as gasification of coal, an abundant national resources.

Government support could be provided in two areas:

Stimulation of plant construction through any one of a combination of the following incentives: low-interest loans, such tax incentives as investment credits, and accelerated write-offs.

Energy cost equalization to ensure that those who adopt coal gasification will not be placed at a future disadvantage with competitors if cheaper energy sources should materialize. For example, cost of imported hydrocarbons may go down as the result of unforeseeable changes in political or international economic forces. To prevent pioneers in adoption of a new domestic energy source from being unjustly penalized by such developments, the availability of subsidies to provide cost parity should be ensured.

Since at least three years of construction time is required to put a coal gasification plant on stream, time is a critical factor if the nation is to derive early benefits from this technology. Priorities should be established so that coal gasification projects can get under way quickly, with related planning to ensure availability of: (a) adequate engineering and construction capabilities; (b) components and systems such as compressors and oxygen plants; and (c) adequate supplies of coal feedstocks.

If indeed a measure of energy self-sufficiency is part of the national goal, then immediate legislation permitting alternate fuel development would serve the dual purpose of getting coal gasification on stream, and enhancing the U.S. Government's position in negotiating for lowest price energy imports.

The time for government action is now.

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AMERICAN GAS ASSOCIATION,
Arlington, Va., September 17, 1975.

Hon. OLIN E. TEAGUE,

*Chairman, House Science and Technology Committee,
374 Rayburn House Office Building, Washington, D.C.*

DEAR CHAIRMAN TEAGUE: The American Gas Association is particularly pleased to respond to your request for briefing material on the Loan Guarantee Program contained in the Senate-ERDA authorization bill.

We are forwarding herewith a briefing memorandum outlining the reasons why the American Gas Association feels most strongly that the \$2.5 billion Loan Guarantee Program contained in the Senate-ERDA authorization bill is vitally important to the development of America's energy resources. The leaders of our industry have concluded with the utmost reluctance that they will simply be unable to proceed with the commercial development of this existing technology without the assistance of a program similar to that passed by the Senate. The failure to develop these resources would be particularly unfortunate since, as is analyzed in greater detail in the attached material, high Btu coal gasification will provide energy to the American economy at less than the costs of generating electricity from coal today.

We urge you, and your fellow members of the House Science and Technology Committee, to accept the Senate bill in this regard, without modification or amendment, in order to insure the timely, commercial development of this proven technology. We would, of course, be most happy to provide you with any additional details, or to personally brief you or any members of the Committee who might have additional questions. I stress, however, our strong belief that the commercial development of high Btu coal gasification cannot, in the public interest, be further deferred.

Sincerely,

F. DONALD HART,
President.

Enclosures: (1) Briefing Paper on Coal Gasification Development. (2) Briefing Paper on Financing Coal Gasification Plants.

COAL GASIFICATION DEVELOPMENT VITAL TO OUR ECONOMY

THE OBVIOUS

America must expand its domestic energy base

The ready availability of energy at reasonable cost has been an essential key to the vitality of the U.S. economy.

Today' double crisis of energy supplies and capital availability demands the rapid development of all of our domestic energy resources.

Market place competition among regulated energy systems has assured the consumer the ready availability of diverse energy forms best suited to his particular needs at just and reasonable costs.

THE PROBLEM

Domestic oil and gas supplies finite

America's domestic oil and gas resources are finite, and they are being depleted. Our oil and gas resources, actual and potential, are being developed and produced as rapidly as sound conservation practices, market place economists, and present technology will allow. But, we must develop alternatives to these natural resources to meet the energy needs of the future.

THE ANSWER: GAS—AMERICA'S MOST EFFICIENT ENERGY SYSTEMS

High Btu coal gasification

Gas is, and for the foreseeable future will continue to be America's most energy efficient, most economical and least environmentally damaging energy system.

The rapid development of coal gasification technology will assist the gas industry in bridging today's gap in deliverable supplies of natural gas as we develop our Alaskan and outer continental shelf resources, and move toward development of technology to serve future energy requirements of the United States.

The natural gas transmission and distribution system—an in-place, \$50 billion investment—is the most efficient, least expensive energy delivery system in the United States. High Btu gas from coal can be readily mixed with natural gas for delivery to the consumer without modification of existing transmission and distribution systems or existing gas appliances, and the need for new transmission facilities would be minimal.

The technology for coal gasification exists today

Largely because of the heavy contributions of America's gas industry to government research efforts.

High Btu gas from coal is less costly per Btu than electricity derived from coal-fired steam generating facilities, or from nuclear derived electricity.

Why a loan guarantee program?

Several gas companies have invested heavily in planning of coal gasification projects. At least two such projects are awaiting requisite State and Federal regulatory approvals. But, neither the regulatory commissions from the viewpoint of the consumer, nor the Wall Street financial institutions from the viewpoint of the capital market, are prepared to assume the financial risks of proving the feasibility of scaling up this existing technology to plant size essential for commercially feasible developments.

Their understandable reluctance arises from: (1) an unwillingness to impose risks that are essentially national risks on consumers in a single state or region and (2) a concern that the relative magnitude of the investment for coal gasification projects as measured against the existing capital assets of these companies might jeopardize the ability of these companies to continue natural gas service to their territories of service in the event of a failure of the coal gasification plant.

This is a particularly valid concern when it is recognized that capital costs of a project would exceed the gross plant of many of our largest gas companies, while the net addition to the company's gas supply would be in the order of 10 percent to 20 percent.

Given this impasse the gas companies simply cannot proceed with the commercial development of this vital technology without a loan guarantee program which will underwrite the technological risks inherent in construction of the first few projects. We are confident that, as the first few projects are successfully complete, the need for this program will be abated.

WHAT ARE THE COSTS?

A review of the various coal gasification projects proposed establishes that the costs of these projects will be in the magnitude analyzed below:

HIGH BTU COAL GASIFICATION FINANCING, CONSTRUCTION COSTS AND GAS PRICE¹

[In thousands]

	Constant dollars (1974)	Escalated dollars (percent)
Plant.....	\$805, 000	\$1, 190, 000
Mine.....	125, 000	187, 000
Plant and mine, total.....	905, 000	1, 377, 000
Price per thousand cubic foot, 1981.....	\$2. 54	\$3. 88
Price per thousand cubic foot, average 1980-2005.....	1. 74	2. 95

¹ Assumes interest charges during construction, estimated at \$400,000, are recovered through rate base. If capitalized, it would add 75 cents per thousand cubic foot to cost of gas.

FINANCING COAL GASIFICATION PLANTS

Because of the continuing decline in discoveries of natural gas reserves in the United States and the national policy favoring the development of domestic sources of energy rather than increased imports, it is generally recognized that the production of high-Btu (British thermal units), gas from coal is required in the national interest. Forty-eight billions of dollars have been invested in gas transmission, distribution and utilization facilities, not only by gas utility systems but by ultimate users. It is absolutely essential that high-Btu gas be produced from coal in order to continue optimum utilization of those facilities. It should also be noted that only the gas utility industry has made any serious effort to sponsor high-Btu gas projects.

Furthermore, gasification of coal is an efficient and economical means of utilizing the nation's vast coal resources—much more efficient and economical, for example, than the use of coal for the generation of electricity. The capital cost average is about three to one and the cost advantage to the residential customer is two to one. Indeed, with current proven technology, gasification is the only economic way in which low-grade lignite reserves can be converted into energy for use in areas distant from the location of the lignite.

While a number of experimental processes are in various stages of development in the United States, the coal gasification process developed in Germany during the 1930's known as the Lurgi process is the only commercially proven process available, and all present sponsors of commercial-scale coal gasification plants in the United States propose to use the Lurgi process. The largest operating Lurgi plant is located in South Africa and is operated by the state-owned SASOL company.

While existing Lurgi plants produce low-Btu gas (400-450 Btu per cubic foot), the production of high-Btu gas (970-980 Btu) by "methanation" has been proven in pilot plant studies conducted by Continental Oil Company for a consortium of U.S. companies and by Lurgi in association with SASOL. Lurgi now includes the methanation step in its guarantee of the results of its process.

The various components of a coal gasification plant, other than the Lurgi gasifier vessels, consist of units produced commercially and regularly employed in chemical plants, refineries and similar installations—e.g., oxygen plants, steam and electric power plants, gas purifiers, pumps, valves, etc.

Sponsors of Lurgi coal gasification projects have uniformly concluded that a plant producing an average of about 250,000 Mcf (thousand cubic feet), of storable high-Btu gas per day (91 billion cubic feet per year) is the optimum size from a technological standpoint. This assumes a plant capable of producing about 275,000 Mcf per day operating at an average load factor of 91%. The energy output of one coal gas plant is equivalent to the output of five 1,000 megawatt nuclear plants.

While estimates of cost of plant and cost of high-Btu gas produced from coal vary somewhat, most estimates place the cost of a 250,000 Mcf per day coal gasification plant at about \$750-800 million in 1975 dollars, while the related

mine facilities are estimated at about \$125 million. When even a moderate inflation factor is included, given the 5-6 year lead time requirement, total plant costs rise to over \$1 billion, while mine costs increase to about \$175 million. In terms of total plant investment, therefore, a high-Btu coal gasification plant and mine will cost approximately \$1.2 to \$1.4 billion.

These amounts do not include any recognition of the cost of funds used during construction (AFUDC). If it is assumed that AFUDC must be raised by the project and capitalized as a part of project costs, approximately another \$400 million must be added, raising total investment to well over \$1.5 billion. However, this cost can be paid currently during the construction period by assessing a surcharge (equivalent to including construction work in progress in rate base) on the customers of the pipeline who will be receiving gas from the coal gasification plant when completed.

While estimates of the cost of gas produced from coal vary depending upon estimates of plant cost, cost of coal and other factors, most estimates indicate that the initial cost at the plant of high-Btu gas produced from coal will range between \$2.25 and \$2.75 per Mcf in 1975 dollars, or between \$3.75 and \$4.25 per Mcf in escalated dollars. If AFUDC were capitalized, the first year cost in escalated dollars would be \$4.50 and \$5.00 per Mcf. Using the higher production costs, this means that the incremental cost to a residential customer for the first year is about \$5.75 per million Btu, compared to \$14.00 to \$15.00 for electricity.

While the initial cost of gas produced from coal may be higher than that of fuel oil or coal on an incremental basis, one of the significant advantages of coal gasification is that the cost of production will actually decline throughout the life of the plant, notwithstanding a continuation of inflationary trends. This results from the fact that the bulk of the cost of the gas is in the fixed costs of the plant (depreciation, taxes and return), which will be reduced as the plant is depreciated and capital is retired. This reduction in fixed costs is more than sufficient to offset increases in variable costs (cost of coal and operation and maintenance expenses), to the point where it is anticipated that the average cost of gas over the 25-year life of a gasification plant is expected to be about 15 percent less than the initial price, while the price of all other commodities will probably have doubled over the same period.

Because of the tremendous capital requirements of even a single coal gasification plant, and because the gasification of coal is a new technology in this country, investors are understandably reluctant to put up the capital required for such projects. Lenders demand assurance that their investment will be repaid, together with interest, whatever the success of the project and whatever physical, economic or political forces affects its successful operation. Equity investors are unable to assume the exceptional risks involved in projects of this magnitude, particularly when faced with limited rates of return and the uncertainties of government regulation and legislation.

Discussions with the financial community have made it clear that, in view of the enormous capital requirements of each project in relation to the size of the sponsoring natural gas companies, investors are unwilling to rely on the credit of the sponsoring companies to provide the assurances they demand against these eventualities.

There are three categories of risk which concern the financial community. These are (1) failure to complete the project—possibly because of cost overrun, (2) failure of the plant to produce to specifications for technical reasons, and (3) failure to operate the plant for whatever reason. State public utility commissioners have indicated that they are not prepared to have the ultimate customers for the gas accept the risks. The sponsoring companies and the project itself clearly cannot accept them. Further, these risks, are, for the most part, uninsurable in the commercial markets.

It is, therefore, in the national interest that the federal government provide some form of financial support for initial commercialization of high-Btu coal gasification.

STATEMENT OF JERRY T. VERKLER, MANAGER OF PUBLIC AFFAIRS OF TEXAS EASTERN TRANSMISSION CORPORATION TO THE COMMITTEE ON SCIENCE AND TECHNOLOGY, HOUSE OF REPRESENTATIVES, SEPTEMBER 18, 1975

Mr. Chairman and Members of the Committee, on behalf of Texas Eastern Transmission Corporation, I appreciate the opportunity to respond to your

request for our views on section 103, which was added by the Senate as an amendment to H.R. 3474, the ERDA authorization bill. This section provides for Federal loan guarantees to be administered by the Energy Research and Development Administration for the construction and operation of facilities designed to produce synthetic fuels and produce energy from renewable resources.

We are happy to support this amendment and urge you and your colleagues in the House of Representatives to accept it in conference with whatever technical modifications which may be required. We believe this is a constructive step forward in the direction of providing more energy supply. The time to act has arrived, if indeed, it is not too late! We must provide our country with the energy it needs to meet our economic requirements in the most environmentally acceptable manner. Therefore, a commercial synthetic fuels program is needed on an urgent basis. We believe this amendment can provide the incentive and the tools private industry needs to begin meaningful production of synthetic fuels, particularly substitute natural gas from coal.

Texas Eastern has long supported a national policy of energy self-sufficiency. As a company engaged in transporting badly needed natural gas and petroleum products to our customers, we have been deeply concerned over the inability of the U.S. energy industry to supply from domestic sources the energy required to meet the Nation's needs. Many constraints have contributed to this inability, but we believe it is time to look forward to solutions to our problems instead of looking backwards to place blame.

We are primarily in the business of transporting natural gas, which everyone now seems to agree, is in critically short supply. To augment this dwindling supply, we, together with our partners are trying to construct coal gasification plants in the United States to take advantage of the Nation's abundant coal resources. The Committee is well aware of the many Federal and state environmental and other regulatory requirements which must be met before a coal gas project can be started. We are actively engaged in trying to successfully meet these requirements and we believe we can. However, even when and if we win the necessary governmental approvals which would let us begin, the private financial community, which must supply the huge capital requirements, still will not lend us the money without something more. That additional something is a guarantee to protect the loan needed to build the project and put it into operation.

Where do we turn? We are ready to act, but we cannot begin until we can finance the project. We believe that H.R. 3474, as amended by the Senate will provide industry with the tools necessary to acquire the capital and get on with the task of helping to meet the Nation's energy needs.

Hopefully, once the first few plants are in operation and prove successful such a Federal program will not be needed.

We think coal is the answer for the short term, and to convert it into badly needed natural gas is the highest and best use of this valuable resource. We believe that the American people and their government recognize that the national interest requires construction of a first generation major coal gasification project in this country. The technology and the will are available. We are asking for the means. To provide ERDA the additional authority to administer a Federal guarantee program is in furtherance of the purposes of the Energy Reorganization Act of 1974, the Federal Nonnuclear Research and Development Act of 1974, and ERDA's recently adopted National Energy Research, Development and Demonstration Plan. Indeed, coal gasification projects will provide early implementation of ERDA's five national policy goals and in our judgment fully warrant priority treatment.

The impact of the synthetic program on the Nation's energy and economy will be very beneficial. In view of the slow recovery of the economy from the recession, in which energy factors played a major role, in thriving synthetics industry would also be most timely. New employment, construction, and development activities will ease current difficult problems in these segments of the economy providing jobs, taxes, and better opportunities for our people and, in many cases, depressed communities. Yet, to avoid so-called "Boom Town" conditions, there is an opportunity to plan and prepare for the growth of the potential new development which would minimize any adverse impact on existing communities.

Again, with respect to coal gasification, which is nearer to becoming a viable commercial fuel source than any other conversion process, we believe it can be the forerunner of a new industry which offers the best opportunity of develop-

ing substantial sources of alternate gas supplies to help offset the rapidly declining gas supplies of the nation. It represents a means for the development of such substantial sources of energy in a highly efficient and environmentally acceptable manner independent of foreign control, and leading toward a greater measure of energy self-sufficiency. This is why we particularly endorse the provision of the amendment which gives a higher priority to substitute natural gas by earmarking \$2.5 billion for this purpose.

The adequacy of gas supplies is a matter of great importance to the Nation because it bears directly on total energy availability, the supply and price of other energy fuels, foreign policy and international relationships, productivity, and the quality of life itself. However, the natural gas supply has steadily declined since the 1960's and finally in November 1970 curtailments of interstate pipelines were first experienced. And these curtailments have vastly increased each year since then, now reaching virtually all parts of our country. For example, firm curtailments by interstate pipelines during the 1974-75 winter totaled about 2.6 trillion cubic feet and are estimated to increase 45% during the coming winter to about 3.7 trillion cubic feet.

In sharp contrast, there is an abundance of coal reserves in the United States suitable for coal gasification. The Nation's coal reserves represent about 88% of its remaining fossil fuel supply potential, and a study directed by the American Gas Association has concluded that there are 186 potential sites for coal gasification complexes offering adequate coal reserves and water supplies for major long term plant operation. Thus, the gas supply potential offered by the development of coal gasification technology is very substantial.

With respect to the environmental impact of synthetic development, I am sure that the Committee is well aware that no shortcuts are being sought or indeed can be taken to avoid complying fully with all state and Federal environmental regulations.

In fact, with reference to our own project we are trying to build, the costs associated with meeting the environmental requirements have accounted for much of the delay and increased costs of the project. But we are prepared to meet them. We believe in a clean environment and recognize that it is costly and time consuming. The requirements of the National Environmental Protection Act are in full force and effect thus revealing all the risks and options for all to see. We feel that after reviewing all the facts, the decision to proceed with careful development is in the overall public interest.

In addition, pursuant to the Federal Nonnuclear Research and Development Act (P.L. 93-577), by placing the loan guarantee program under ERDA, additional environmental safeguards, or constraints, depending on your point of view, are invoked. Like few if any other agencies, ERDA is required by provisions of sections 11 and 13 of Public Law 93-577 to pay special attention to environmental and water resource evaluations, over and above the requirements of NEPA. The guidelines for protecting the environment are more advanced for this Federal agency than any other of which I am aware.

I think a word must be said in answer to those who conceive of this program as a huge, risk-free giveaway to private industry. In the first place, especially with respect to coal gas, we are confident of the technology and therefore the likelihood of the guarantee being invoked is minimal. Hopefully, no Federal funds will ever have to be expended, but yet if we have such a financial "back-stop," we believe then that the financial market will provide capital to us much like it did to the housing market with the advent of FHA and similar programs. Secondly, these plants with escalation are going to cost in the \$1 billion range. In addition to borrowed capital, the companies involved will be risking hundreds of millions of their own assets in building them. It isn't a giveaway, but instead it is hopefully a mechanism for getting on with the job of providing additional supplies of energy for the American consumers free of foreign control. The return to the producers of substitute natural gas is completely regulated by existing governmental bodies and there is no opportunity to make any unusual or unreasonable profit on these projects.

In summary then, to use coal gasification as an illustration, it seems clear that the following points are germane:

1. Coal is the best source for establishing any degree of real U.S. energy independence.
2. Gasification of coal is its most environmentally acceptable and capital efficient use. These plants will be more environmentally efficient as to emissions than is required by Federal and state environmental statutes.

3. The gasification of coal is highly capital intensive, and delays already have increased permanently the cost of facilities through inflation.

4. Time is of the essence from the standpoint of creating this energy alternative and of doing so at the lowest possible cost. The loan guarantee is the most rapid means of permitting the financing of these plants and minimizing the effects of inflation. We should move ahead now with this program this year. Other meritorious programs can be added as they are studied and defined further.

5. The price of gas from coal will be regulated by the FPC since it will move into interstate markets commingled with natural gas.

6. A network of natural gas transmission and distribution systems exist within the United States which have supplied as much as one-third of the Nation's energy requirements. It is presently available to transport coal gas. Every forecast that has been made shows a pessimistic picture as far as supplies from conventional sources are concerned.

The conversion process from coal to substitute natural gas is available now. Its conversion efficiency is almost twice as good as for the conversion of coal to electric energy, and its cost to the energy consumer is approximately one-half that of electric power. The development of a coal gasification industry in the United States is vital and could contribute significantly to the objective of project independence.

7. Because of the magnitude of the capital costs, and the relative uncertainty of governmental policies which will bear on the economic results of such projects, private capital is understandably reluctant to commit funds with only the project as security. However, project sponsors generally do not have resources adequate to undertake risks of this magnitude. It is therefore urgent that governmental financial assistance be provided to properly qualified projects in order that energy may be produced at the earliest possible date.

Again, I appreciate this chance to express our views on this amendment, and we urge your support of it. We believe it offers the Congress the opportunity to demonstrate to the Nation and the world its determination to act positively and forthrightly in meeting our country's energy needs.

DOW CHEMICAL U.S.A.,
BENNETT BUILDING,
Midland, Mich., September 17, 1975.

HON. OLIN E. TEAGUE,
Chairman, Committee on Science and Technology,
Rayburn House Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: The issue currently before the House Committee on Science and Technology involving loan guarantees for ERDA is, indeed, of high significance. These loan guarantees are vitally concerned with and, perhaps, an integral part of any program in the U.S. which is intended to produce synthetic fuels and to produce energy from renewable resources. Additionally, they may be useful in a related, and equally important field—that of producing, from coal, clean feedstocks for the petrochemical industry.

The fact that the question of such guarantees is now before you evidently presumes that technology in these fields has been developed to the point that they are now ready for commercial development. This is true, in that at present there are two technologies which are considered ready for commercial application. These are the Lurgi coal gasification process for synthetic natural gas and the retorting process to convert oil shale into crude oil. These technologies can utilize our vast resources of coal and oil shale, but are not commercialized today because of the uncertain economic climate and the current financial market. Geothermal heat is being utilized in a modest manner, but it, too, suffers the same uncertainties.

To our knowledge several projects in each category have been indefinitely delayed or cancelled due to economic uncertainty. The world price of oil is set by the OPEC countries based on political as well as economic considerations. Prices for natural gas and crude oil production in the U.S. are determined by federal regulation. For these reasons private industry is unable to determine by conventional economic analysis what the future price for energy will be, and since these new technologies are more expensive than current energy and feedstock production methods the overall uncertainties have delayed the projects.

We feel the problem to which loan guarantees would apply has two distinct facets: (1) Development of Technology and (2) Commercialization of developed Technology.

DEVELOPMENT

A basic need in the United States is the development of advanced technology for economic conversion of fossil resources to synthetic fuels and feedstocks, as well as processes for producing energy from renewable resources. Research and development costs involving research, pilot and demonstration plants to achieve this objective are immense and probably beyond the capability of private industry to fund in conventional ways. It seems, therefore, appropriate for the federal government to provide assistance in this development and we support the ERDA program as stated in the ERDA National Plan.

COMMERCIALIZATION

The major task of ERDA is to stimulate research and development leading to economic synthetic fuels processes as well as processes to produce energy and feedstocks from renewable resources. This task should be performed in such a way that private industry will be in a position to commercialize the technology in the future. We think that the federal government can play an important role in stimulating the commercialization of these technologies through a program for construction and operation based on some type of loan guarantee as included in the Senate Authorization Bill.

The incentives which such guarantees would provide are necessary because of the uncertain world-wide and domestic energy and economic conditions which have, in fact, caused private industry to delay or cancel some major projects.

A further incentive which the Committee might like to consider is a patent policy which would not be unnecessarily inhibited by the loan guarantee program.

We feel the potential impact on the nation's energy economy of a 6 billion dollar loan guarantee program would be positive for the most part in that it would serve as an incentive in the manner we have discussed. There is, however, some apprehension that if the total amount were allocated to construction alone, it might tend to detract from the critical need of funds for technology development.

I trust this will be of assistance to you and the Committee in their deliberation on the question of loan guarantees for ERDA.

Sincerely yours,

M. E. PRUITT,
Vice President, Research & Development.

STATEMENT BY CHARLES H. BROWN, SENIOR VICE PRESIDENT,
THE OIL SHALE CORPORATION

THE URGENT NEED FOR A FEDERAL LOAN GUARANTEE PROGRAM TO ENCOURAGE COMMERCIAL-SIZE DEMONSTRATION OF SYNTHETIC FUELS PRODUCTION, SEPTEMBER 18, 1975

Mr. Chairman and Members of the Committee, as an independent publicly-owned energy company, The Oil Shale Corporation ("TOSCO") and its refinery subsidiaries—The Lion Oil Company of El Dorado, Arkansas, and Toscopetro of Bakersfield, California—have a vital interest in the ERDA authorization bill (H.R. 3474) as amended by the Senate. As an industry leader in oil shale research and development, we believe that the loan guarantee authority added by the Senate for synthetic fuel commercialization could unlock vast domestic sources of energy, lead to significant new technological developments and could ultimately help to reduce the Nation's dependence on foreign oil. As an independent oil refiner, we believe that commercial production of synthetic fuels could, in the long term, offer significant relief from the crude oil supply squeeze which faces U.S. independent refiners. We are confident that the Senate loan guarantee amendment is in the public interest, and we respectfully urge that the amendment be accepted by the House.

No one questions the vastness of our Nation's oil shale reserves, which are larger than all of the petroleum reserves in the Middle East. However, many people mistakenly assume that private energy companies will develop commercial technology in the coming decade and be ready for full production when oil supplies from the North Slope begin to decline. The sad truth is that synthetic fuels technology will probably remain in the pilot plant or semi-works experi-

mental phase for years unless there is an effective national program to encourage commercial-size demonstration plants.

Based on 15 years of experience in organizing private efforts in oil shale development, it is our considered opinion that the first generation of commercial-size oil shale plants cannot be financed today by traditional methods in private financial markets. If the Nation expects to evaluate the environmental feasibility and economic viability of oil shale production before the mid-1980's, the loan guarantee program in H.R. 3474 is imperative.

Private companies can and do find funds for small pilot-plant and semi-works plant experiments. For example, TOSCO and its various venture partners have raised and expended more than \$50 million on such technological developments; other individual companies have spent up to \$20-25 million for similar purposes and will probably continue to do so. However, when it comes time to invest \$1 billion or more to scale up a technology to meaningful commercial-size demonstration, it is our experience that the money is simply not forthcoming. Many investors say they would be willing to participate in a second plant after the first one demonstrates its feasibility; but we have found none who will sign up for a first plant to begin on any specific date before 1980.

To those unfamiliar with oil shale development, this reluctance on the part of private investors would imply that oil shale technology is not ready for commercialization, or that oil shale is not an economically viable source. On the contrary, our own semi-works demonstrations (of 1,000 barrels per day production) have shown that 100% of the assayed oil content of U.S. shale can be extracted for marketing by the TOSCO II process. Major energy companies in both the U.S. and in foreign countries have licensed the TOSCO process. It may not be the ultimate technology; it may be a DC-3 instead of a DC-10; but it works. And engineering designs for a 50,000 barrel per day facility are virtually complete. Field construction could begin in six months.

The major problem is money. As I pointed out in my testimony to this Committee last year on H.R. 17400, double-digit inflation has ballooned the cost of a commercial-size oil shale plant and attendant reserves from \$250 million in 1967 to more than \$1 billion today. The largest energy companies are unwilling to commit resources of this magnitude to pioneer synthetic fuels ventures today; because they are already committed to huge capital outlays for conventional petroleum development in such costly areas as Alaska, the North Sea, off-shore and secondary and tertiary recovery projects in the Continental U.S. Conventional petroleum is their primary business; synthetic fuels have a lower priority.

Many smaller companies, such as independent refiners, marketers, and chemical and fertilizer companies, need oil supplies for the future and would like to enter oil shale production. Although these companies could add competition to the energy industry, they do not have access to private funds of the magnitude necessary to finance a commercial-scale project.

Underwriters tell us that the equity market is in such disarray that it is virtually impossible to undertake new equity issues for new risk ventures. Insurance companies and pension funds say that they have more requests for loans to projects of proven worth than they can possibly fill. Banks offer no real source for 20-25 year loans because they specialize in short-term funds.

In our most advanced commercial oil shale project, we are undertaking to get investment participation from companies which have not heretofore been producers of petroleum. We are organizing a broadly based venture of eight to ten companies—oil, steel, chemical fertilizer companies, farm co-operatives and electric power companies—users as well as marketers of oil, to build the Nation's first commercial-size oil shale facility. Six companies—including a farm co-op, two steel companies and a chemical company—have expressed sincere interest if the government would help assure access to 75 percent of the capital requirement by guaranteeing loans. Otherwise, they cannot be interested, because even 10 percent of a \$1 billion risk investment would encumber too many other assets and unduly limit other capital expansion plans equally important to the future of the U.S.

The lead time required for a synthetic fuels plant is six to seven years from concept to first production, including 1-2 years for an environmental impact analysis; one year for design engineering and 3½ years for construction. The U.S. must have some first generation synthetic fuels plants underway before 1977 or the Nation cannot even evaluate synthetics as a potential energy source before the mid-1980's. Private industry and the private investment community have too many urgent projects on their plates to undertake another one during

the next several years. Therefore, in the national interest, it is necessary for government to step in and, by loan guarantees, assure that limited funds flow to pioneer synthetic fuels projects now so the resource can be evaluated before 1985.

This is precisely what the Senate version of H.R. 3474 would do. The provision was adopted by the Senate Interior Committee without dissent and with bipartisan support, and the bill, as amended, passed the Senate by a vote of 92-2.

The loan guarantee program should be equally acceptable to the House. Yet, I read accounts in the press which, while not questioning the need for a multi-billion dollar effort to produce vital energy and stimulate the economy and reduce unemployment, question this relatively modest guaranteed loan program. The questions raised are based on the same old misconception and half-truths which have plagued synthetic fuels development for years. May I respond to some of the questions raised:

1. It is alleged that a \$6 million loan guarantee program is too large and "would drain capital needed for other purposes such as housing." Simultaneously, it is also alleged that the \$6 billion program is too small, that "it will take at least \$15 billion in investment to produce one million barrels a day" of synthetic fuels.

The truth is that the U.S. currently has some \$200 billion per year of personal and corporate savings available for private and public investment. H.R. 3474 would channel about \$1.5 billion per year, for 6-7 years, into pioneer synthetic fuels plants.¹ This \$1.5 billion, less than 1% of total national outlays, could hardly paralyze housing, federal borrowing, or any other capital program.

No one who understands the bill would pretend that the loan guarantee program in H.R. 3474 is even designed to produce one million barrels of synthetic oil (or gas equivalent). It is a limited incentive program to get a few pioneer commercial-size plants built so that government, industry, and private investors can properly evaluate the economic and environmental feasibility of synthetic fuels. If the results are what we at TOSCO expect, we believe that future plants will be financed solely by private capital. If the results are what a handful of critics expect, the Nation can walk away and forget synthetics.

2. It is alleged that the program would strip-mine vast areas, deplete water resources, ruin streams, destroy wildlife.

This misrepresentation appears in virtually every criticism of oil shale development; and I would like to set the record straight. Strip-mining of the oil shale area in the U.S. is not even economically possible. 93% of the deposits are deep underground—as deep as 2,000 feet below the surface; and, because the seams are so thick (60 to 100 feet) and can be mined underground economically by the largest earth-moving equipment used in highway construction, there is no need for strip-mining.

Nor will loan guarantees for oil shale commercialization jeopardize existing water resources. Duke R. Ligon, former Assistant Administrator of FEA, stated earlier this year that FEA studies indicate that ample water exists in Colorado for initial oil shale development and that water availability would not constrain oil shale development until the industry reached at least 1 million barrels per day. Oil Shale's share of the \$6 billion loan guarantee program would probably involve, at the very most, three projects totaling 150,000 barrels per day of production. And these three projects would provide a clearer picture of the water needs for future plants and the usability of underground waters in the shale itself, which are not now included in water availability studies.

A commercial oil shale plant, as designed by TOSCO and its venture partners, will not ruin any surface streams or destroy wildlife. We have spent millions of dollars to prove to ourselves and to all fair-minded investigators that no pollutants will escape the elaborate diked areas designed into the facility and that spent shale can be vegetated in a manner which enhances the grazing area for native mule deer. Any visitor to our semi-works plant can see that native grasses and shrubs thrive on our spent shale terraces. The deers, long forced to exist on the sparse sagebrush which took over the oil shale surface area after farmers had overgrazed it, even jump the fences to get to the grass and shrubbery which has prospered on our shale residue plots for five years now.

Any project qualifying for a loan under the H.R. 3474 guarantee program must meet the Environmental Protection standards of the federal, state and local governments. In the case of our advanced project, we and our joint venturers have filed with appropriate government agencies some 16 volumes of environmental

¹ Calculation assumes that the guarantee authority of \$6 billion would be used over six or seven years to guarantee 75 percent of a total \$8 billion investment.

analysis data. This is for one commercial-size oil shale plant. The Bureau of Land Management has been writing and re-writing an Environmental Impact Statement on this one project for 14 months. When completed, there will be public hearings. Surely the Environmental Protection Agency and the state regulatory bodies are sufficient to protect the environment, if it takes 1½ years to prepare an Environmental Impact Statement.

3. It is alleged that the "lion's share" of the \$6 billion authorization in H.R. 3474 would go to the big oil companies.

As a relatively small independent company, we at TOSCO believe we can compete with any company or group of companies—however large—on a project proposal for a guaranteed loan if the award is based on merit and not on financial assets. We expect to organize a joint-venture project proposal which will include several companies which are not presently in oil production at all. It will probably also include two or three major oil companies, each with a 10–15 percent interest, because:

A. Major oil companies own or control leases on most of the available oil shale and coal properties. Some of this property was acquired as long ago as 1919. If developed, major oil companies must be involved;

B. major oil companies hold certain patents and have proprietary know-how on certain processes (such as hydrotreatment, coking, etc.) which are invaluable to the success of the project; and

C. major oil companies have experienced managerial and technical people essential for the success of the project.

Although major oil companies should and will be included, they do not have to get the "lion's share." In fact, the government loan guarantee program should enable non-oil companies and farm co-ops to enter synthetic oil production ventures in which they could not otherwise participate. The oil industry should be more, not less, competitive because of H.R. 3474.

4. It is alleged that a government loan guarantee program will "increase population and overtax the community facilities" of the synthetic fuels plant areas.

In a nation with 7.8 million unemployed people where government employment agencies and private bus companies are offering inducements to get people to move from heavy unemployment areas to areas of employment opportunities, it is remarkable that anyone would oppose a new employment program on the grounds that the resultant population increase would be bad for the country. This implies that it is better for the unemployed to remain unemployed where they are.

However, a common-sense analysis of the socio-economic impact of a synthetic fuels plant in a community would indicate that the effects are clearly manageable. For example, construction of a commercial oil shale plant involves peak employment of some 2,000 workers. Permanent plant employment would be about 1,000 workers. Our studies show that, in our own proposed project in western Colorado, some of these people are already located in the area. Net population increase would probably be less than 5,000 people at peak of construction; and we have been working with local and state government officials on advance community planning and have contributed funds for this purpose. Plans are already underway for a new community addition—homes, trailer parks, schools, sewers, etc.—to be ready before the construction workers arrive.

The reason that these problems are clearly manageable is that synthetic fuels projects provide ongoing income, employment and tax revenues to support public services. For example, State of Colorado studies indicate that it takes \$1,500 per year to support the education of one child. Let us suppose that an oil shale plant adds 1,000 new pupils to the local schools costing \$1.5 million per year. The property taxes that will be paid by the oil shale project on its production facilities alone will be in excess of \$5 million per year. There will also be 1,000 permanent families paying property taxes, sales and state income taxes. If any community is financially capable of supporting itself, this one should from the outset.

The critics say, however, that the front-end investment to build classrooms is the problem, that classrooms cost \$70,000 each, The sales tax alone on the equipment involved in an oil shale plant should run more than \$8 million. In addition, there will be 1,500 to 2,000 construction workers paying state and local taxes during the three year construction period. This front-end money should certainly build enough classrooms for 1,000 pupils with millions left over for sewers and health and recreation facilities.

My point is that if government and industry will sit down and analyze socio-economic problems one by one, plant by plant, instead of viewing with alarm

the so-called massive impact of a preposterous hypothetical situation in which eight or ten plants spring up overnight in one area of one state, the population increase problem is of manageable proportion. In fact, providing public services for new tax-paying families working in a tax-paying synthetics plant on a permanent basis is a "problem" that many states and communities would like to have.

5. It is alleged that this bill would be "a high profit, no-risk deal for corporations that wanted to go into the synthetic fuels business."

Anyone making an allegation of this kind has certainly not read the bill.

The loan guaranty provision of H.R. 3474 limits by law the guarantee of loans to 75 percent of the cost of a project. Equity participants must supply 25 percent; and their 25 percent goes down the drain first if the project fails to meet its loan payments. The Senate Interior Committee report makes it clear that, in the event of foreclosure, the government would get the plants, the coal or oil shale reserves associated with the plant and the right to practice any technology involved for 75 percent of the original cost. The government exposure to loss is minimal. Private lenders have no exposure, because their investment is guaranteed; but the companies which built the plant could lose everything they invested. In a \$1 billion venture, that could be \$250 million. Does that sound like a "no-risk deal?"

As to profits, we would hope that the companies which undertake these pioneer projects could show a profit. The projects must have earnings to repay the huge loans which government will be guaranteeing. After that and only after that, the people who put up the 25% equity should get a reasonable return on their investment.

However, we have shown our earnings projections on a commercial-size oil shale plant to many companies and lending institutions. They are less than overwhelmed. The only people interested in participating in a pioneer oil shale plant are those who need the oil on a long-term basis and calculate that the probable cost of shale oil will be comparable to future foreign oil prices. Of the potential investors we have canvassed, not one company has expressed an interest in participation as a source of profit.

If the loan guarantee program successfully stimulates commercial oil shale production, the greatest financial beneficiary could be the United States Government, which owns approximately 80 percent of the Nation's oil shale reserves suitable for development. The proprietary value of these vast reserves in the public domain will obviously be increased if the viability of their commercial development is demonstrated.

CONCLUSION

In the national interest, the federal government must step in and assure the flow of limited capital to a limited number of commercial-size demonstration synthetic fuels plants. H.R. 3474 will do just that. We urge its prompt enactment and implementation.

[The following additional statements were submitted for the hearing record:]

STATEMENT BY JOHN S. GILMORE, SENIOR RESEARCH ECONOMIST AT THE UNIVERSITY OF DENVER RESEARCH INSTITUTE, AND PROFESSOR IN THE COLLEGE OF LAW, UNIVERSITY OF DENVER

Construction cost estimates on coal and oil shale conversion plants have escalated steeply. This makes it unlikely that large scale demonstrations of synthetic fuels production technology will occur soon merely as a result of market forces. If it is national policy to expedite such demonstrations, Federal government subsidy is probably necessary.

The loan guarantees proposed in the amendments to S. 598 appear to be a reasonable choice among the available forms of subsidy. They will transfer much of the financial risk inherent in these innovative demonstrations from the owners and debt holders of oil shale companies to the Federal government.

However, there are apt to be other, involuntary risk-takers involved in some of the prospective demonstrations. These are the citizens and taxpayers of some of the small, isolated Western communities which must accommodate the rapid population growth inherent in large scale construction projects followed by immigration of permanent mine and plant employees.

Two considerations, equity and efficiency, suggest that the Federal government (or, alternatively, the customers for the synthetic fuels) should share the community development risks and costs, too.

Equity suggests that these residents and taxpayers should not have to pay increased debt service and operating costs for new schools, water and sewer systems, streets, hospitals, and mental health services required by rapid growth—the boomtown costs. These residents and taxpayers will see little effect except higher taxes and user fees, crowding, skyrocketing housing costs, and disruption of established life styles.

Equity would suggest that Federal financial assistance be given to the communities affected by the synthetic fuels demonstrations, just as it is given to the companies carrying out the demonstrations.

Efficiency will be served only if the local facilities and goods and services are available in time to accommodate the influx of construction workers. Meeting time and cost milestones of construction progress will depend on the quality of community preparation and development. Efficiency in operations will also depend on the quality of life that can be maintained.

The lessons of Rock Springs and Gillette and Fort McMurray—recent boomtowns—must be applied to the planning and to the financing of the demonstrations: failure in community development can lead to unexpected failures in project accomplishment.

The demonstration projects, like other large scale undertakings in such isolated areas, will require adequately financed community expansion and functioning. Unless the Federal program provides this, it will be neither equitable nor efficient. This suggests that the Senate committee intent in this direction, voiced on page 87 of the Committee report, should be embodied in the legislation.

JOHN S. GILMORE.

(This writer is Senior Research Economist at the University of Denver Research Institute, and Professor in the College of Law, University of Denver. These opinions and judgements are his own, however, and not those of his employer or of sponsors of his research.)

ENVIRONMENTAL DEFENSE FUND,
 Denver, Colo., September 16, 1975.

Representative OLIN E. TEAGUE,
Chairman, Committee on Science and Technology, U.S. House of Representatives,
Rayburn Office Building, Washington, D.C.

DEAR CHAIRMAN TEAGUE: Thank you very much for inviting the Environmental Defense Fund to provide your Committee with our views concerning subsidies for synthetic fuels development, in particular the proposed \$6 billion guaranteed loan program now under consideration in the Congress.

The Environmental Defense Fund has studied and monitored the many complex factors associated with the development of synthetic fuels from oil shale and coal. Most recently, we have examined in detail the four-volume federal government Synthetic Fuels Commercialization Program Task Force report.

It is clear both from this recent study and from our previous work on this subject that numerous significant problems exist, ranging from the tremendously high costs of synthetic fuels production to the potential for severe adverse environmental impacts, should development proceed. These problems are coupled with the sobering expectation that the contribution of synthetic fuels to our energy economy will be minimal, even with a large-scale, multi-billion dollar government-subsidized program.

Indeed, the federal Synthetic Fuels Commercialization Program Task Force report concludes that synthetic fuels will have a "negligible" effect on the international oil cartel's strength, balance of payments problems and expected embargo losses (Volume I, pages 41 and 43). This report also concludes that the costs to the government of any synthetic fuels subsidy program exceed the benefits (Volume I, page 44). In addition, it seems clear that a large synthetic fuels program would create substantial pressure to keep the world price of oil at artificially high levels, with the resultant adverse effects on the economy and on consumers.

These serious questions about the desirability of a large government-subsidized synthetic fuels program serve to underline our strong feeling that the Congress should investigate and study this multi-billion dollar program thoroughly and deliberately. It seems eminently unwise to proceed with a program of such great magnitude without even holding hearings on the subject. The planned briefing of the Committee by Administration proponents of synthetic fuels subsidies on September 18 is no substitute for proper Congressional scrutiny, which would at a minimum include full public hearings where all sides of each question could be aired.

We would be pleased to offer the Committee the results of our continuing study of these topics, should the Congress decide to proceed with hearings on synthetic fuels subsidies.

In addition, we draw your attention to the enclosed editorial from the Rocky Mountain News. It articulates many important concerns about synthetic fuels development.

Sincerely,

KATHY FLETCHER,
Staff Scientist, Rocky Mountain/Great Plains Office.

[From the Rocky Mountain News, Monday, Sept. 15, 1975, Denver, Colo.]

THE COSTLIEST HALF-HOUR

A thorough and candid federal report now makes official what has been known in Colorado for a long time: That any large-scale program to convert the West's vast coal and oil shale deposits into synthetic fuels will cause serious social and governmental disruptions in rural communities, and bring about devastating environmental effects.

The report, described in Sunday's News by Columnist Jack Anderson and News Writer Richard J. Schneider, was prepared by an advisory task force in response to President Ford's call for a federally-subsidized crash program to produce synthetic fuels equivalent to a million barrels of oil by 1985.

The task force concluded—somewhat audaciously—that the social and environmental costs of Ford's proposal so outweighed the benefits that the President ought to trim his 1985 synthetic fuels production goal from a million down to 350,000 barrels a day.

Ford's Energy Resources Council, which must pass on the study, takes a dim view of that idea, as do the large energy corporations which stand to reap the benefits of Ford's loan guarantee proposal.

But for our money—which is what Ford proposes to spend—the staff report wasn't strong enough.

Because the development of 350,000 barrels a day in shale-oil or coal-gas production, or even a million barrels, as Ford proposes, will bring about only a miniscule gain in this nation's energy supply while imposing a staggering burden on the rural West.

Even assuming that radical conservation measures can be imposed between now and 1985, U.S. energy demand by then will have risen to at least the equivalent of 48 million barrels of oil a day. Ford's plan to underwrite the energy companies' multi-billion dollar investment in synthetic fuels will yield enough to last America a half-hour a day, come 1985.

What will be the real cost of that half-hour? To America at large, it could range from the \$6 billion loan-subsidy Sen. Henry Jackson, D-Wash., proposes, to perhaps the \$100 billion synthetic fuels development corporation that Federal Energy Administrator Frank Zarb wants to set up along the lines of the independent U.S. Postal Service.

But to Colorado, Wyoming and Montana where most of the raw materials would be mined, the cost of Ford's crash program in synthetic fuel conversion couldn't be measured in dollars, and could never be repaid in dollars, no matter how much revenue was generated for the people of the region.

The cost would include boom-town growth in which housing, schools and vital municipal services couldn't keep pace with demand; the social problems that follow boom-towns everywhere; the irreparable scarring of the landscape with strip-mining and spent shale deposits; the consumptive use of scarce water resources; the deterioration of air and water quality; and the impact of sudden population growth on wildlife and recreation areas.

Even with a serious energy shortage, these are not trivial concerns; if Ford has his way, they will alter forever the face and future of rural Colorado.

This newspaper recognizes that America's increased reliance on domestic energy resources threatens to impose some of these costs on the rural West in any event. What's more, we have no quarrel with the idea of federal incentives to help develop those resources appropriately.

But the federal report just completed makes clear that President Ford has other alternatives which could produce the additional million barrels a day he seeks without subjecting this region to the impact that synthetic fuel production would have. But whether he can be influenced to consider them is a matter of some doubt.

But we submit that if the promoters of such alternatives as geothermal energy and solar energy were able to muster the kind of lobbying pressure in Washington that the oil industry has put behind the synthetic fuels proposal, much of what rural Colorado now faces could be avoided.

PUBLIC CITIZEN,

Washington, D.C., September 17, 1975.

HON. OLIN TEAGUE,

U.S. House of Representatives, Rayburn Building, Washington, D.C.

DEAR CHAIRMAN TEAGUE: The Energy Research and Development Administration fiscal year 1976 authorization bill reported by the Science and Technology Committee and passed by the House includes many millions of dollars for energy research and development. Your committee received hours of testimony, deliberated upon many proposals and rejected numerous amendments to increase budget items. On several occasions, both in committee and on the floor, amendments were rejected because, it was argued, time had not allowed sufficient study or analysis and ERDA, in its initial year of operation, was not prepared for such programmatic responsibility. It was said that no programs were included in H.R. 3474 which were not fully explored through testimony and staff examination.

The Senate counterpart for the ERDA authorization is S. 598. It includes a \$6 billion provision empowering the Administrator to guarantee loans for the commercial demonstration of synthetic fuel production processes. There is neither

any mention of this program in H.R. 3474 nor, we understand, was a single minute of testimony on this program offered to the Science and Technology Committee or Subcommittees. We further understand that on September 18, a special briefing session presented by Administration officials and dealing solely with this loan program will be held for the Committee conferees and members. Congress Watch, on September 15, was requested to submit comments prior to this briefing.

Given a proper amount of preparation time a more complete description of views on synthetic fuels and loan guarantee programs will be presented. In the meantime, Congress Watch hopes that the prudent attention given during recent months by the Committee on Science and Technology to the ERDA funding will continue. We view the consumer interest as best served by rejecting the \$6 billion loan program in the S. 598—H.R. 3474 conference.

Questions concerning the feasibility of production of one million barrels of fuel per day (the designated loan program goal) by synthetic processes, the collateral social consequences, the efficiency of this program as opposed to other research and development methodologies included and excluded from H.R. 3474 and the loan recipient selection process are serious and deserve intensive study.

Until the appropriate subcommittee receives testimony from a wide range of organizations and individuals concerning the numerous ramifications of such a loan program and, until analysis has been presented publicly examining the cost/benefit of such a program, and until more is known concerning the provision's exact energy research and development implications, we believe further legislative action to be unwarranted. We recommend that the Committee conferees be instructed to reject the S. 598 loan guarantee program for synthetic fuels.

Sincerely,

JOAN CLAYBROOK.

SIERRA CLUB,

Washington, D.C., September 18, 1975.

HON. OLIN E. TEAGUE,

*Chairman, Committee on Science and Technology, U.S. House of Representatives,
Washington, D.C.*

DEAR MR. CHAIRMAN: Thank you for your letter of September 15, 1975, asking for our comments on the Senate version of H.R. 3474, the ERDA Authorization bill, which contains a \$6 billion provision for loan guarantees by ERDA for the construction and operation of facilities designed to produce synthetic fuels and to produce energy from renewable resources. This provision is not contained in the House-passed version.

We strongly urge your committee to reject the loan guarantee provision. There is not at present sufficient information to support expenditures of such large sums of money on highly questionable energy programs. We believe that it is premature to embark on a National Synthetic Fuels Program before there has been full public hearings and debate. Obviously the time has been too short for us to prepare detailed comments on the proposal. We earnestly ask you to avert precipitous actions on the Senate provision, and we look forward to a future opportunity to present our views in more detail on this important public policy issue.

Sincerely,

LINDA M. BILLINGS,

Washington Representative.

SOUTHERN CALIFORNIA GAS CO.,

600 NEW HAMPSHIRE AVE., N.W.,

Washington, D.C., September 19, 1975.

HON. OLIN E. TEAGUE,

*Chairman, Committee on Science and Technology, House of Representatives,
Washington, D.C.*

DEAR MR. TEAGUE: I am submitting with this letter a statement by Mr. Raymond Todd, President of Pacific Coal Gasification Company, urging approval of a loan guarantee program in the pending ERDA authorization bill, H.R. 3474. Pacific Coal Gasification Company, an affiliate of Southern California Gas Company, is an equal partner with Transwestern Coal Gasification Company, a Texas Eastern Transmission Corporation subsidiary, in the Western Gasification Company (WESCO) project proposed to be built in northwest New

Mexico, to deliver coal gas to southern California and the mid-west. Fifty copies of Mr. Todd's statement are herewith filed with the Committee on Science and Technology.

Very truly yours,

RUFUS W. MCKINNEY,
Vice President.

Enclosures.

STATEMENT OF RAYMOND W. TODD, PRESIDENT, PACIFIC COAL GASIFICATION
COMPANY, SEPTEMBER 19, 1975

Texas Eastern Transmission Corporation, the parent of our partner in the Wesco Coal Gasification project, presented a statement to the Committee on September 18 regarding support for Section 103 which was added by the Senate as an amendment to H.R. 3474, the ERDA Authorization bill. Pacific Coal Gasification Company would like to add its support for that amendment.

After several years of regulatory processing, the Federal Power Commission issued Opinion No. 728 on April 21, 1975 approving the transportation and sale of the gas to California and Midwestern customers. In that Opinion the Commission stated:

... we are acutely aware of the need for this country to develop its own sources of energy. The coal gasification process is a means by which the United States may attain a greater measure of energy self-sufficiency and reduce its vulnerability through dependence on foreign markets. Coal gasification is one of the few potentially commercial means of developing a supplemental supply of gas from domestic sources.

In issuing that decision, however, the Commission did not provide conditions which would allow the financing of the Wesco project. The California Public Utilities Commission in its petition for rehearing and a subsequent filing with the Federal Power Commission stated that the Wesco project is in the public interest and should be certificated. It also stated that the Wesco project cannot be placed in operation without Federal assistance. The gas supply situation in southern California is such that without new supplies of gas by 1979 at the very latest, serious shortages will result for consumers who have no alternatives to natural gas. The Wesco project has estimated costs, as of January 1975, of over \$850 million and by the time the plant could be constructed, such costs, it is estimated, would be in excess of \$1 billion. Potential investors in a project of this magnitude will require assurances that their investment will be repaid even in the unlikely event of premature project termination—assurances which Pacific Coal Gasification Company and its partner and their parents are not in a financial position to give.

It is apparent that the Federal Power Commission and the sponsors cannot provide either individually or in combination adequate credit support for investors, and in the case of this project, ERDA assistance is essential and appropriate. Under an ERDA guarantee program as proposed, the only situations in which a monetary outlay would be required is in the remote possibility that the project cannot be completed, cannot be operated, or becomes uneconomic for reasons beyond the sponsor's control.

The Wesco Coal Gasification project has the potential to be the first large coal gasification plant in the United States. It has been described by the FPC as "experimental" and it will serve as a demonstration facility to evaluate the technology and feasibility of advanced coal gasification processes, methanation technology, and environmental control technologies. There are many possible modifications to the lurgi process and other new processes also now being developed which will have to be ultimately tested on a large scale. It is expected that substantial technological improvements will be developed during the early operation of the project which will substantially benefit the development of a coal gasification industry in the United States.

Under an ERDA financial guarantee program, the Wesco partners would be willing, subject to proper protection of proprietary rights to mutually agree to:

- (1) Designate one gasifier which could be used from time to time for special testing, research and development of improvements.
- (2) Provide space, operating labor, coal feedstock, process connections, and utility services at Wesco's cost for special coal gasification research

facilities installed and owned by ERDA, including advanced gasification and liquefaction processes to be tested on a commercial scale.

(3) Provide for the use of many plant streams which may be available for special research or testing for environmental or technological improvements, and

(4) Make non-proprietary operating and test data from Wesco's facility available to ERDA.

Prompt action is necessary. The project is rapidly approaching the stage where construction can begin. It is in the national interest, is in full accord with and will provide substantial implementation of ERDA's National Energy Research, Development and Demonstration Plan, and is urgently needed by the people of California and the Midwestern states to help offset their rapidly deteriorating gas supplies. The potential contribution of coal gasification to the economy, to the environment, and to the people of the United States is enormous. The Wesco participants have expended more than \$18 million on the project and are prepared to commit millions more when the project receives satisfactory regulatory approvals. Because of inflation each month of delay is estimated to add \$5.5 million to the project's cost. An ERDA loan guarantee will permit the Wesco participants to proceed at the earliest possible time to seek the necessary financing for the project.

GARY OPERATING Co.,
FOUR INVERNESS COURT EAST,
Englewood, Colo.

POSITION PAPER ON THE 1976 ERDA AUTHORIZATION BILL

Gary Operating Company, a Denver based independent energy company, recently submitted to this Committee its comments regarding those parts of Senate Bill S. 598 dealing with the proposed loan guarantee program for synthetic fuels. It is Gary Operating Company's position that the loan guarantee provisions of the Bill, as they apply to the development of a shale oil industry are premature. We recommend that a major commitment be made by the federal government, through ERDA, toward assisting industry research, development and demonstration of larger scale processes for shale oil recovery and utilization. Only then, can and should large scale "commercialization" or "demonstration" occur.

Gary Operating Company engaged Colorado School of Mines Research Institute (CSMRI) to conduct a comprehensive study of the present status of existing technology and other problems facing the shale oil industry. CSMRI is well qualified for such a study as a result of a continuing involvement with the industry, including the administration of a \$7.5 million dollar oil shale research program sponsored by six domestic oil companies at the Anvil Point facility of the United States Bureau of Mines. A report titled, "A Practical Approach to Development of a Shale Oil Industry in the United States", has been completed by CSMRI. A copy is attached for your consideration.

[The referenced report is on file with the Subcommittee on Energy Research, Development and Demonstration (Fossil Fuels).]

The CSMRI report concludes in part:

Oil shale can be a viable source of liquid fuels. The oil shale reserves of Colorado, Utah, and Wyoming must be developed, but development must be carefully planned and undertaken. Oil shale development faces many problems. Too-rapid development of uncertain technology has the potential for serious environmental, social, and financial effects. A partial list of technical, environmental, social, and financial problems follows.

TECHNICAL

Technical aspects of the shale oil industry which need further research, development and demonstration include:

1. Testing of proposed commercial retorts on a larger scale. Operating experience from an experimental 1000-ton-per-day retort is adequate for design and construction of a demonstration 10,000-ton-per-day retort. Previous testing is insufficient for design, construction, and operation of many 10,000-ton-per-day units in a commercial complex.

2. Materials handling and logistics for mining, shale transportation, and production distribution.
3. Determination of optimal combinations of retorts of different types in a single complex.
4. Optimization of refining techniques including processes for removing nitrogen from shale oil.
5. Disposition of low heating value retort gas.
6. Testing of in-situ fracturing and retorting techniques.
7. Determining effect of retorting conditions on recoverability of associated valuable minerals in oil shale.

ENVIRONMENTAL

Shale oil production will be a "heavy" industry. Potential environmental problems are especially acute since the industry will be built in a relatively pristine environment. Potential environmental problems requiring actual data for solution include:

1. Surface disturbance from construction of mines, production units, utility and transportation corridors, and towns.
2. Air pollution from fugitive dust.
3. Air pollution from retort and refinery gases.
4. Water pollution from mine drainage.
5. Water pollution by retort and refinery liquids.
6. Revegetation of spent shale.
7. Water pollution from spent shale and overburden piles.
8. Water Requirements.
9. Disruption of wildlife habitats and migration trails.

SOCIAL

Since the oil shale regions are sparsely populated, influx of new population to construct, operate, and service the industry will have a large social impact. Some potential social problems include:

1. Degradation of the "quality of life" in the oil shale regions.
2. Inadequate housing.
3. Inadequate social services including schools, roads, water supplies, sewage treatment facilities, urban protective services (police, fire departments), hospitals, and recreational facilities.
4. Inadequate tax base for building new towns and providing expanded services in existing municipalities.
5. Increased localized inflation.
6. Increased crime rates.
7. Displacement of existing, largely agriculturally oriented, population due to the changing economic base.

FINANCIAL

A major shale oil industry will involve many billions of dollars in capital and many thousands of skilled workers. Risks are high since a commercial shale oil industry has not existed in the United States for generations and modern fuel extraction technology has not been demonstrated adequately. Attracting sufficient private capital into a high-risk venture would be difficult in the best of times and is especially difficult under present economic conditions. Existing economic problems which must be reconciled before an industry can develop include:

1. Uncertain costs of shale oil arising from hazardous extrapolations of current mining, retorting, and refining technology and experience.
2. Uncertain future costs of competitive foreign crude from sources such as OPEC.
3. Uncertain future costs of competitive domestic fuels.
4. Uncertain costs of protecting the environment.
5. Uncertain "front-end" costs which may have to be absorbed by the industry to reduce social impact in the oil shale regions.

We believe that the many problems which are yet to be resolved can be solved in a more acceptable manner by embarking on a gradual, well planned, oil shale industry expansion rather than by initiating a crash program to build a multitude of large-scale oil-shale complexes.

The recommendations for the development of a shale oil industry made by CSMRI include:

Oil Shale deposits in the Rocky Mountain states should be utilized to supplement U.S. domestic supplies of hydrocarbon liquids. The development of the oil shale industry should be initiated promptly and built up at a gradual rate concordant with proper consideration of technical, social, environmental, and financial factors.

Prior to embarking on a program of massive government incentives to force commercialization of the shale oil industry, additional funds should be invested in research, development, and demonstration to determine the best methods for, and the actual costs of:

1. Construction and operation of various individual full-size retorts.
2. Upgrading and refining of shale oil.
3. Adequate environmental protection.

Close cooperation should be maintained between government agencies at all levels. Close coordination with industry is also essential to allow the development to proceed in an expeditious, orderly manner and to minimize duplication of effort.

Area and regional planning studies should be completed at an early date by state and local agencies with appropriate industry cooperation. The federal government should recognize that funding assistance will be necessary to complete these studies and that additional federal funding and/or loan guarantees will be needed until an adequate tax base is developed for construction of new communities and essential services.

It is Gary Operating Company's opinion that the CSMRI study clearly and logically points out the need for significant additional research, development and demonstration efforts, prior to the commitment of more federal funds in the form of loan guarantees for plant construction. This additional research, development and demonstration is necessary to insure the development of adequate technology, acceptable environmental controls, optimum economics and acceptable social impact. Such an approach will insure a lasting and viable domestic shale oil industry with greater capability and sooner than a crash "commercialization" program.

Our review of the proposed ERDA authorization bill (S. 598) indicates that approximately one-half of 1 percent of the total authorization as proposed, is directed towards the development of an oil shale capability. This level of funding, and the exclusion of any demonstration projects, is in noticeable contrast with ERDA's commitment toward coal conversion and nuclear development, even though the technical, environmental, economic and social problems are equally as great. We recommend that a sizeable commitment must be made by the federal government, through ERDA, toward assisting industry research, development and demonstration of larger scale processes for shale oil recovery and utilization. Only then, can and should large scale "commercialization" or "demonstration" occur.

In recent months considerable dialogue has centered around "commercialization" of a synthetic fuel industry and more specifically development of a shale oil industry. In our judgment, this dialogue is premature and unrealistic in light of the overwhelming number of unknowns. We wholeheartedly agree that a commercialization program is advisable and necessary at the conclusion of a research, development and demonstration program. Informed estimates of the current cost of synthetic fuels from oil shale range from \$12 to \$20 per barrel. Current domestic oil prices, unproven commercial shale oil technology, environmental and social costs would indicate that under today's conditions, the industry is not and cannot be "commercial". This is not to imply that the needs of national security, threat of future OPEC price increases and the domestic economy do not dictate that a shale oil industry be developed. We suggest, however, that under present conditions such development cannot be accomplished under the concept of "commercialization". The government, and more specifically this Committee has in the past recognized this "boundary" between the industrial segment and national interest and has adequately responded by the creation and funding of agencies such as the Atomic Energy Commission, Office of Coal Research, Bureau of Mines, and more recently the ERDA Administration. Under today's conditions, and to accomplish the goal of developing a shale oil industry in the shortest time possible, we suggest government support can best be directed into additional research, development and demonstration funding of industry efforts on a scale less

than that proposed for "commercialization" or "demonstration" under Section 103 of S. 598.

This Committee and others must also address themselves to the mechanism whereby high cost synthetic fuels from pilot, semiworks and demonstration synthetic fuel plants enter the conventional energy market place. Today it appears that price controls on conventional petroleum fuels will continue in effect for several years. This results in domestic fuel costs being substantially less than world prices. This situation places a sizeable additional economic burden upon an emerging synthetic fuel industry. This unrealistic economic burden must be remedied to provide further incentive for the development of a synthetic fuels industry. It is our opinion that remedy can best be provided through a program which would permit a department of the United States Government, preferably the Department of Defense, to enter into purchase contracts for synthetic fuels at prices above the current low domestic fuel prices. These preferential synthetic fuel purchase contracts would apply only to the first increment of production from each different synthetic fuel technology and would terminate after a specified demonstration period. In addition to providing further incentives to a synthetic industry, this procedure also encourages, rather than precludes, continuing competition for improved processes and technology.

To accomplish the development of a viable shale oil industry, we specifically propose:

That the ERDA appropriation be amended to include authorization of \$500,000,000 to be used for direct grants for the construction of full-scale in-situ and above-ground retorting demonstration facilities with a limit of \$100,000,000 per grant, providing further that the ERDA grant share will not exceed 75 percent of the cost of construction and operation of the process for a period of up to 24 months. Raw shale oil produced from such demonstration projects would be purchased by ERDA at a guaranteed price of \$15.00 per barrel up to a maximum of 6,000 barrels per day per demonstration project. Such production would then be refined into specific fuels for evaluation and testing by the Department of Defense with the Department of Defense paying actual cost of refining.

Further authorization, up to a maximum of \$50,000,000, should be provided for grants covering 75 percent of the cost for construction and operation of transporting, storing and refining facilities to converting the production of demonstration plants into satisfactory fuels to be used for testing and operational purposes by the Department of Defense and/or other governmental agencies.

An additional sum of \$50,000,000 be authorized for direct grants and loan guarantees to local governments, specifically for the construction of necessary community facilities and services where significant population influxes or other adverse impacts result in undue burden on the community from these synthetic fuel activities.

This procedure and funding, as outlined above, will provide the following benefits:

1. Provide minimum realistic incentives and funding for the construction and operation of any reasonably potential, full-size shale oil production equipment and processes on a scale sufficient to adequately evaluate technology, cost of production and environmental damage and control. This demonstration phase will permit actual evaluation and encourage development of second generation technology, without the threat of irreversible environmental and community damage or massive loan failures.

2. Insure the development of a sound, economically viable and environmentally acceptable industry which ultimately will be capable of producing larger volumes at lower costs, and sooner than an industry forced into existence too soon, too large and too fast.

3. Result in a lower ultimate cost to the government. Initial costs per barrel may be higher from smaller operations; however, this will be more than offset by lower costs per barrel by perfecting technology prior to large "commercial" scale commitments.

4. Provide finished, refined shale-derived fuels, necessary for operational testing and evaluation by the military and other large fuel consumers, thereby permitting the development of necessary fuel specifications, engine modifications and maintenance procedures for utilization of new synthetic fuels.

5. Significantly reduce community and social impact and damage by encouraging industry "build-up" at a rate consistent with the ability of communities and

services to keep pace while providing a tax base capable of supporting additional growth as true commercialization occurs.

In our opinion, the above-mentioned procedure will best accomplish the objectives of this Committee, industry, the Nation and its people.

Respectfully submitted,

TURNER C. SMITH,
Executive Vice President.

The CHAIRMAN. Bob, do you have any kind of a statement?
Mr. FRI. I don't have a formal statement, Mr. Chairman.

STATEMENT OF ROBERT W. FRI, DEPUTY ADMINISTRATOR,
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION;
ACCOMPANIED BY MERWYN C. GREER, CONTROLLER, ENERGY
RESEARCH AND DEVELOPMENT ADMINISTRATION; R. TENNY
JOHNSON, GENERAL COUNSEL, ENERGY RESEARCH AND DEVELOPMENT
ADMINISTRATION; AND S. WILLIAM GOUSE, ASSISTANT
ADMINISTRATOR FOR FOSSIL ENERGY, ENERGY RESEARCH AND
DEVELOPMENT ADMINISTRATION

Mr. FRI. I probably ought to clarify my position somewhat, and the position of the administration.

We have responded, as you know, to a communication from Mr. Hechler on several sections of the Senate bill, including the section on loan guarantees.

The administration's position on the whole subject has not been worked out, notably, some of the technical changes in the Senate language, which we think are required. Particularly the Treasury Department has certain problems, from a technical standpoint, and I would have to defer to their wisdom on those kinds of things.

I have made pretty much on my own account, I guess, the decision that I'm prepared to talk, to the extent I think it is feasible, on the subject of loan guarantees, and if I get to a point where I think the administration's position is not clear, and I need it, I'm going to have to tell you that. But I will try to be as responsive as I can, and we have some people here who know a lot about the facts of the situation in the synthetic fuels industry, and I assume that facts are always available to the committee, so we'll try to do the best we can.

The CHAIRMAN. Bob, do you have a list of the questions there?

Mr. FRI. Yes, I do. I guess I have the same ones.

The CHAIRMAN. How about starting with No. 1, and proceed to comment on them, and take whatever time you might want?

The first question: What, if any, analyses have been made of the capability of energy suppliers and/or users to construct demonstration facilities leading to the commercialization of synthetic fuels?

Mr. FRI. A number of analyses have been conducted, both by ERDA and by the Task Force on Synthetic Fuels Commercialization, conducted and led by Bill McCormick of the OMB staff.

Let me try to respond generally to that.

The situation appears to be that there is the capability. First of all, all of the potential constructors of these kinds of facilities, of which there are perhaps 35 or 40 in the whole country who are interested, have been contacted. They fall into a couple of classes. The first is the

pipeline gas companies, who are interested in pipeline quality gas. Their assets tend to be relatively small, relative to the size of these plants. Other companies, for example, large oil companies, interested in oil shale production, have assets that are quite plentiful in connection with building an oil shale plant. However, the pipeline gas companies, being a regulated industry, are able to raise financing on a rate basis, just as the utilities are.

So both from a financial standpoint and from a physical standpoint, that is to say, the availability of engineers, materials, and so forth, my guess is that there is adequate capability out there to put plants under construction. Certainly, the *prima facie* evidence of that is that there are a number of companies who are interested, and have already spent some of their own funds developing plans for such plants.

The problem comes down to a question of technical and financial risk for one-of-a-kind, or first-of-a-kind, type plants, and, of course, that's what the loan guaranty program is all about, is to help ameliorate the financial risks incident to building a first-of-a-kind plant, particularly in cases where the profitability of the enterprise depends, to some degree, on the uncertainty of future oil prices.

But the basic structure, I think, is out there, and the question is: How does the Federal Government go about providing the incentives to bring the first of these plants into being?

But contact has been made with a very large number of potential people, and we don't see great inhibitions, other than the ones I mentioned.

The CHAIRMAN. Any questions by the members on this particular question?

[No response.]

The CHAIRMAN. Bob, does this affect a particular part of the country? For example, the coal mines in one part of Pennsylvania, are they any different from those in the Western States?

Mr. FRI. Yes. The general thrust of a synthetic fuels program inevitably winds up in the West. That's where a good part of the resource comes from.

However, because of the shale out there, which is the only available shale there is, then, of course, there's coal out there, and a good deal of coal in the East as well.

Perhaps Dr. Gouse, the Deputy Assistant Administrator for Fossil Energy, would know better than I, but we would anticipate plants being built in both parts of the country for gasification purposes, for coal.

The shale plants, at this stage of the game, necessarily will be a Western States operation. There is a great deal of shale in the East, up in Michigan, for example, but with those the technology is not really available to attack those under this program.

Mr. HECHLER. Mr. Chairman.

The CHAIRMAN. Ken.

Mr. HECHLER. Can you quantify that any? Because there's a lot of eastern coals available, I would assume, not only for gasification but for liquefaction.

Mr. FRI. I can't quantify it, but maybe Bill Gouse back here can.

Dr. GOUSE. I'm not sure what you mean by to "quantify."

Mr. HECHLER. I mean by "quantify," the old parochial question of what's the matter with the East.

Dr. GOUSE. Nothing. There's plenty of coal in the East. Generally it's more expensive to mine than the coal in the West at the present time. But it's also closer to markets, so that transporting a lot of the finished product would save you some money.

I would expect coal liquefaction to go almost anywhere. I don't necessarily see any preference for a region in the country for that.

Gasification probably would start in the West, as the Western coals are a little easier to gasify than the Eastern.

Mr. HECHLER. By the word "quantify" I meant—if I could ask another question here, Mr. Chairman—I was just trying to get some concept of the relative size of the synthetic fuels operations overall between what you call west and what you call east.

Dr. GOUSE. There is really no way to make that estimate at the present time. If it was in proportion to the amount of coal, probably a third of the industry in the Appalachian region, and two-thirds in the rest of the coal regions, which are the Midwest, as well as the West.

Mr. FRI. I guess we're having a little trouble with the question because, given that we're entering into a commercialization venture here, the actual locations of the plants depend very heavily on how each individual entrepreneur sees his economics, who his customers are, and so forth, and we don't know that until we go out for bids.

Mr. HECHLER. I think that you have an analysis of the quality of your basic materials, and the amount of water in the coal, and the availability of these basic materials, which I assume you have to analyze before you go ahead with either demonstration of commercialization.

Mr. FRI. I guess we could try to provide you for the record, Mr. Hechler, an analysis on that basis. I suspect it would tend to come out, in general, pretty much the way Dr. Gouse suggested. If you look at it simply from the standpoint of where the reserves are and what is gasifiable and liquefiable, maybe a one-third-two-thirds split would result. But we would be happy to try to make some estimates on that.

Mr. HECHLER. The whole point of my question is directed not so much at pork barrel or parochial interests, as it is to the use of the loan guaranty provision. Is this going to lock you into an uneconomic operation, so far as your basic research is concerned. This is really the issue that I'm concerned with.

The CHAIRMAN. Bob, suppose we run through all of these questions, and then open it to questioning.

Mr. FRI. Whatever your pleasure is on that.

The CHAIRMAN. The second question is: What, if any, effect will such loan guarantees have on the capital markets and other domestic energy alternatives which may be more economic?

Mr. FRI. On the question of capital markets, we're talking about—I'll sort of pick a size—take a million barrels of oil a day as a synthetic fuels commercialization program, we're talking on the order of \$15- to \$20-billion of investment over a period of 10 years or so.

The loan guaranty program would be part of that. That is a large, but not excessive, figure, in terms of the capital markets in the country. Annual business investment runs on the order of \$40 million, for example. So that we're not talking about a gigantic fraction. We know

that the total cost of energy development may run into in excess of \$600- or \$700-billion over the next 15 to 25 years. Estimates that I have seen, made by everybody from the Treasury Department to the Brookings Institute, suggest that capital formation of that magnitude is quite possible.

So that I don't think that there would be an adverse consequence for the capital markets of the country.

As to the other domestic alternatives, which may be more economic, the purpose of setting out on this course of action is to bring into being the basis for the synthetic fuels industry, as a matter of national priority.

My own guess is that these plants will turn out to be economic, because my own personal feeling is that oil prices, for one reason or another, will not drop precipitously, although I suppose I could get into an argument on that.

To me—and I'm going now on logic we used in the national energy R. & D. plan that we submitted to the Congress on June 30—one of the crucial issues here is that we may very well need something on the order of 10 million barrels a day of synthetic fuels by the end of the century. In order to achieve that level of production, simply because there isn't an alternative source of liquid and gaseous fuels, we really have to think very seriously about putting a million barrels a day capacity in being in the next 10 years, whether it's terrifically economic or not, in the short term, because if we don't build that base, if we don't learn how to build these very large plants, and we don't learn how to solve the environmental problems and social and institutional problems that come along with this kind of very large development, there is not, in my judgment, any chance at all that we could move from 1985 to the year 2000 and add 9 million barrels capacity. So to me it's important to push this technology to commercial scale, even if the first few plants are not necessarily economic, which they may or may not be.

The CHAIRMAN. The Senate had some hearings. Do you know whether it's their intent that the loan guarantees be used solely for the construction of one-of-a-kind technology commercial plants, or whether for support facilities that may be required, such as schools, roads, and other public facilities that you might need?

Mr. FRI. I'm not familiar with the Senate's intentions on that point, Mr. Chairman.

The CHAIRMAN. All right. Let's go to No. 4. How many facilities, and of what size do you anticipate could be built with a \$6 billion loan program? Have you considered that yet?

Mr. FRI. Let me try to get at that question this way: A \$6 billion loan guaranty program would probably result in something on the order of 7 to 10 or 11 plants, coal liquefaction, gasification and oil shale. It's a little hard to tell because it depends a lot on the mix of proposals one gets and how big they are, and also how much of the total loan that the loan guarantee program would support.

The Senate language would authorize support up to 75 percent of the project cost, but, obviously, we would not have to go that high, and the lower we could keep the Federal participation the more leverage we would have in the total capital.

There are other factors, though, that will support a potentially commercial industry, which are being considered in our own studies, and

for which an administration position is not yet firmed up. However, obviously we have to look at things like supply of front-end money, or price subsidies, both of which are already included in the ERDA legislation. I think any total commercialization program would lean on all of those authorities, and the \$6 billion loan guaranty program would be a part of that, and therefore when I say "This would support 7 to 10 plants," you might, in fact, with these other authorities, together with this, build 15 or 20 altogether in the total commercialization program.

Loan guarantees have an important application, but it is not the only tool that we need, in my judgment, to develop a commercialization program.

Mr. HECHLER. Mr. Chairman, I didn't hear something that was said. I don't have a substantive question, but I'd like to get the phrase completed.

Did I hear you say the administration position is not firmed up? Is that the phrase you used?

Mr. FRI. The administration is in the process of trying to develop its approach to a synthetic fuels commercialization program. That decision has not yet been made by the President.

The CHAIRMAN. Bob, if some kind of a loan program provision is put in this legislation, do you feel that you people could approve an application in 1976, or are there technical, regulatory, environmental, or other associated problems that would keep you from doing it?

Mr. FRI. I think that we could probably get an environmental impact statement put together. As a matter of fact, we are already working on one, on a contingent basis. We can get the environmental impact statement put together, have it reviewed, and finished within the next 6 months or so. There is obviously some administrative chore of getting set up to administrate such a program, getting out the appropriate regulations. Fortunately, fiscal 1976 is 15 months long, and if you give me all 15 months so that we can get proposals, I would say that there is a good chance that we would have it very close to getting the show on the road.

The CHAIRMAN. The Senate provision would authorize loan guarantees to any applicant, including companies that have a good cash flow position, but are reluctant to invest in such high risk facilities, and companies that are owned or controlled by foreign entities. What are your views on whether such guarantees should be limited to lender of last resort situations and to U.S. citizens or nationals and corporations substantially controlled by U.S. citizens and nationals?

Mr. FRI. Those are areas, Mr. Chairman, that get into substantive questions of administration position.

Let me offer up, purely as a personal matter, a couple of thoughts on the subject, but I really cannot give you the administration's position on it.

On the question of the lender of last resort, I am not that sure what that means, but let me make this point: It seems to me that we have to go into the synthetic fuels commercialization, or into any loan guaranty activity, including the geothermal loan guaranty program that we have, with the notion that we are undertaking a fairly hard-headed business arrangement and trying to let the Government to absorb the risk of the venture over and above the normal commercial risk that would be absorbed by the private sector in a venture of this sort. I do

not think that puts the Government in the position of a lender of last resort. What I think it does, and what I would like to see happen personally—and I stress that personally—is to make sure that in these ventures we have involved sufficient equity capital in the private sector, as well as some measure of debt from the private sector, so that the private sector is absorbing all of the risk that would be absorbed in a normal commercial enterprise, and then that the Government guarantee the risk beyond that.

As to the question of foreign technology, let me offer this one comment, and that is an issue where I guess I have to claim I don't have a position. I think the issue here, to me, is not so much one of who owns the technology as a question of can we be sure that that technology will serve the interests of the United States. Namely, will the product be made solely in the United States and will whoever has the technology, whoever builds these first plants, be willing to support the development of future plants, which means making certain information available, either to the public or other possible investors, or possibly licensing agreements of technologies, and so forth? If it serves the interest of the United States in that way, in my own personal judgment, I am not too concerned about whether foreign investors are involved, but, in fact, there are some pluses to that from a foreign exchange standpoint.

Mr. MOSHER. Sir, may I ask a question?

The CHAIRMAN. Let's finish these questions, and then we'll have it open to any questions later.

Mr. MOSHER. This relates to the—

The CHAIRMAN. [interrupting] Can you ask the question later?

Bob, the next question is then, if there is a loan guaranty should it be subject to the patent provisions of the new Federal Nonnuclear Energy Research & Development Act of 1974?

Mr. FRI. OK. That's a fairly technical point. We haven't worked out an administration position on it.

I guess my own view on that—if you don't mind getting nonadministration positions out of me—is that, looked at purely from the standpoint of contract law—I'm not a lawyer, and maybe counsel better support me—but looking at it from the standpoint of contract law, the consideration of the contract of the loan guaranty, to me, does not really match the consideration of putting all your background patents into the hands of the Government. That's quite a sacrifice, when the Government may not, in fact, spend a dime on the whole project.

I would like to see us work out a scheme whereby we don't have to get into absorbing a bunch of commercial patents solely on the basis of a loan guaranty.

The CHAIRMAN. Should the loan guaranty authority be available for demonstrations of any new energy technology, including those utilizing energy resources and those related only to energy conservation?

Mr. FRI. We would prefer, on a variety of grounds, that at this point this loan guaranty authority apply to synthetic fuels, coal and oil shale. There are two good reasons for that:

First of all, renewable resources include presumably geothermal and solar. In the geothermal area we already have a loan guaranty program. I doubt that we need two. In the solar area, the solar electric

kinds of things, photovoltaics, ocean thermal, and so forth, are not now at the stage where a loan guaranty program is going to make a whole lot of difference because we don't have technologies which are anywhere near, in most cases, economic for commercialization.

In the case of solar heating and cooling, it seems to me that the Congress has elected to go a demonstration route, through the Solar Heating and Cooling Act, which this committee considered.

In the first place, I think that is a reasonable way to go, and not venture loans, in the solar heating and cooling situation.

In the second place, if Congress wants to change its mind on the basic approach to promoting solar heating and cooling—if I may offer a gratuitous comment—I think it would be better to take it up as a separate subject, rather than as a part of the ERDA authorization bill. I think it's an important policy question that ought to be fully discussed.

As to conservation, I think that a loan guaranty program would get to be very confusing, because there are lots and lots of little conservation projects. It is a very difficult program to administer. I think our challenge there is to come up with conservation technologies that are economic in their own right, no one of them typically so large that it strains the financial capacity of industry. The technological character of most of the technologies is low grade. There is not a lot of technological risk associated with this, and it strikes me that a loan guaranty in conservation would be very tough to administer, (a) because of the fragmented character of the program, and (b) it is probably unnecessary.

The CHAIRMAN. Bob, do you have any comment on the proposed default provision in the Senate amendment?

Mr. FRI. That's the recourse provision?

The CHAIRMAN. Yes.

Mr. FRI. May I postpone that? That's a technical point too, that I don't have an answer to.

The CHAIRMAN. Yes.

Mr. MOSHER, do you have a question?

Mr. MOSHER. Mr. Fri, earlier in your comments you referred the proposed 75 percent participation level in the Senate bill.

Now, that means that the Government would guaranty 75 percent of the loan, is that correct?

Mr. FRI. My understanding of the Senate provision is that we, the Federal Government, could guaranty 75 percent of the total project cost.

Mr. MOSHER. And 100 percent of the construction cost?

Mr. FRI. And 100 percent of construction cost too. That is my interpretation of the Senate provision.

Mr. MOSHER. I suspect, from your earlier comments, that you were suggesting to this committee that a wise level might be less than the 75 percent. Do you want to comment further on that?

Mr. FRI. My own view here—and again I stress it is a personal one—is that the Government ought to be in the position of absorbing risk in excess of normal commercial risk.

Now, these plants are somewhat risky, but they are not so new, and so novel, that I think the Government ought to be in the position of guaranteeing 100 percent of construction, even a 100 percent loan

during the construction phase, to get commitments from the private sector and from the banking community, who is going to have to finance these numbers 2, 3, and 4 of these plants, because we are really going to be in the business of getting started.

I think it is important to attract equity capital from the business community, the investor, the entrepreneur, who are going to put this thing up, and to, as much as we can, attract debt capital from the commercial banking community for construction loans, and the capital markets for permanent financing.

Now, that will vary a great deal from case to case, but my own view is that we ought to try to get somebody else's dough into this thing, and when the banks say, "Look, I can't go beyond this, because it just goes beyond the coverage of the loan, and just gets to be too risky," we say, "Fine. We'll guarantee the balance of that loan." But maybe we only wind up with a 50 percent guaranty.

Put the other way, I certainly don't think that the Federal Government ought to go out and say, "Anybody who wants 75 percent of his loan guaranteed just has to ask."

Mr. MOSHER. Are you suggesting this would be sort of an ad hoc thing, a certain ceiling perhaps, but basically ad hoc?

Mr. FRI. No. There ought to be a ceiling, and the Administrator ought to prescribe regulations that tell this pretty clearly to potential investors how he will evaluate these propositions, and he perhaps would want to say that he will look more favorably on propositions that have somebody else's money in it first than propositions that don't.

Mr. MOSHER. I would agree there certainly should be some incentive in there for as much private investment as possible. Is that the point?

Mr. FRI. That's the point.

Mr. MOSHER. You would try to secure as much private risk as possible?

Mr. FRI. That's true.

Mr. MOSHER. You referred to "normal commercial risk level." What do you mean by that? It would vary?

Mr. FRI. It varies from project to project. For example, if you are dealing with a regulated industry, where they can get a rate for this stuff, then the whole issue may be simply one of whether the plant works or not, and once it works the guaranteed rate that they get for the product in interstate use, if the FPC gives them the right rate level, is adequate guarantee for the permanent financing.

So you might have a situation there where the Government has to provide a fairly large loan guarantee during the construction phase until everybody sees that the plant works, and then the Government can walk away from the whole deal because the guaranteed rate is adequate coverage for the operation.

Mr. MOSHER. Would you expect that the particular private industries involved here would frequently be your public utilities?

Mr. FRI. The pipeline companies are specifically what I'm thinking of. There are pipeline companies interested in building high British thermal unit gasification plants in order to supply pipeline quality gas to their pipelines. Those are regulated industries. There might be utilities who join together to build low British thermal unit gasification plants, for all I know.

Mr. HECHLER. Mr. Chairman, I have a lot of questions. I don't want to impose on other members of the committee who have questions to ask, and I would like to reserve some of my time.

I would just like to ask one question to underline what you say is ERDA's position.

As I understand it, you feel that this loan guarantee provision should be confined 100 percent, and exclusively, to the fossil fuel area. Is that correct?

Mr. FRI. What I'm doing, Mr. Hechler, is making sure that I answer that question right.

Mr. HECHLER. I think you answered it right the first time. I just asked you if my understanding is correct.

Mr. FRI. I answered it right, from my standpoint. I think that we sent you a letter, which says that we are not interested in the aspects of this for renewable energy resources.

Mr. HECHLER. Then the answer to my question is yes, that ERDA feels that this should be applied 100 percent exclusively in the fossil fuels area?

Mr. FRI. That's what we said in our letter, right. So that is ERDA's position.

Mr. HECHLER. I have a lot of other questions. I would much rather defer to other members of the committee first, Mr. Chairman.

The CHAIRMAN. Do any members have questions?

Mr. WYDLER. Mr. Chairman.

The CHAIRMAN. Mr. Wydler.

Mr. WYDLER. My initial reaction to this—and it is an initial one, because I haven't had a chance to really go in any way deeply into it—is it sounds to me like this is some sort of ripoff of the American taxpayers, and I'm willing to be turned from that point of view as I study it. But that's my initial reaction now.

Whom are you going to guarantee? Who gets the guarantees that you're talking about?

Mr. FRI. On a loan guarantee program, typically the guarantee is actually to a bank. The bank makes a loan, and the Federal Government guarantees principal and interest payment on that loan, so—

Mr. WYDLER [interrupting]. That isn't the important fact, though. Let me ask you, is it the intention of this provision that if a company, let's say it's a big, very well-to-do coal mining company, goes into this project and invests, gets loans of \$100 million from a bank; the Government comes in and guarantees the loan to the bank so the bank will make the loan; the plant turns out to be a commercial flop, nobody wants the product; it's too high-priced—as I think, as I read this report, they said this stuff is going to be too high-priced to be marketed after they develop it—nobody wants the product; you have a nice big plant; the company lets the plant go; they default on the loan; the Government comes in and pays the loan, pays the interest and pays the principal to the bank, now, does the U.S. Government sue the company and get back its money?

Mr. FRI. That is the recourse provision problem, on which I did not comment because we really have got to have an administration position on that.

Mr. WYDLER. Well, unless that's so, then the guaranty is not to the bank. The guaranty is really to the company. The company isn't investing anything. It's a federally financed project, and the Federal Government takes the whole risk. Isn't that what the end result is going to be?

Mr. FRI. At a minimum, the Government winds up with the plant.

The recourse question has to do with whether you get recourse back from the underlying assets of the parent corporation.

Mr. WYDLER. I realize the Government would end up with the plant. The only reason they would let the plant go is that it's not commercially feasible. In other words, they give you a white elephant for your money. They're not going to give it to you if they're making money out of it. They're only going to give it to you if they're losing money, and that's when they're going to give it to you.

As I read this report—I don't know whose report it is—but the committee has provided it—they say that, as plainly as you want to say it, they say right in the report:

Federal incentives are needed to cut the Gordian knot of economics for the first generation of synthetic plants. The marketplace does not now provide sufficient incentives for an adequate mechanism for the encouragement of the establishment of this industry.

Now, that in plain English means it just isn't economically feasible, and the only way to make it so is to have the Government go and take all the risk.

Mr. FUQUA. Mr. Chairman. Would the gentleman yield?

Mr. WYDLER. I'd be glad to yield.

Mr. FUQUA. I think, to clarify, part of the question of my good friend from New York, they have to put up 25 percent of the equity themselves, so they have a one-fourth interest. But the Government only guarantees 75 percent.

Mr. WYDLER. That may be so on paper, of course. I've seen some of these Federal programs, and we all know how they operate, where you don't know what the real investment is. They go in and they tell you 100 percent is so much, and that the Government is only guaranteeing 75 percent, but that's really the whole amount of money that's involved in the project, the 75 percent; and, really, the industry has nothing to lose. We've seen that over and over again in the FHA programs, and that's just an open invitation to all kinds of shenanigans here.

As I say, I'm willing to be convinced here, but my initial reaction, from listening to this, is that the guaranty is really to the company, that walks off with no risk, and that's not free enterprise in any way.

Mr. HECHLER. Would the gentleman yield?

Mr. WYDLER. I'll yield to the gentleman, yes.

Mr. HECHLER. The Senate provision provides 100 percent during the period of construction. I just wanted to point out that it's not 75 percent all the way through. It could go up to 100 percent, under the Senate provision, during the construction period.

Mr. THORNTON. Would the gentleman yield further?

Mr. WYDLER. Yes, I yield to the gentleman.

Mr. THORNTON. The recourse provision, which has not been responded to because ERDA does not have a position regarding it, does also raise a question as to what action the Government must take in the event of default. Subparagraph 3, which is referred to, says that:

In the event of default, the Administrator shall notify the Attorney General. Upon such notification, the Attorney General shall take such action against the obligor or any other parties liable thereunder as is, in his discretion, necessary to protect the interests of the United States.

The interesting thing is that the language provides for mandatory use of the powers of Government to recover the loan from the obligor, and leaving some discretion, which is not completely defined, as to how

that obligation is pursued. So it raises an interesting question as to whether the Attorney General is obligated, under the terms of the Senate language, to pursue the obligor, to the extent of bankruptcy even, if default occurs on the loan.

The CHAIRMAN. Would the gentleman yield?

Mr. THORNTON. Surely. I will be glad to yield.

The CHAIRMAN. My interest, Jack, was stimulated by a number of small companies coming to me and saying that nobody but a major company could do this unless there was some kind of a loan provision, and there's considerable indication of that from the statements we have here, where all the major oil companies say "No" to a loan guaranty provision. That was your general loan provision. It isn't a rip-off of any form, kind, or fashion, as I understand it.

Mr. WYDLER. I understand the Chairman's motivation. I said I'm willing to be convinced.

The only thing is, as I heard some of the earlier testimony, it was that these companies that may get these loans are going to have a good cash flow position, or that type of thing. I guess that would eliminate the city of New York. But as far as a small company is concerned, I just wonder how many small companies are going to be able to show they have a good enough cash flow position to ever qualify for one of these guarantees.

The CHAIRMAN. Do you people have an opinion on that? Does it exclude the small companies, if we put a loan provision in there?

Mr. FRI. I seriously doubt that a small company has the kind of cash; however, it does depend on what you mean by small company. Pipeline gas companies are small relative to an oil company, but pipeline gas companies would probably be involved in this program. Their total assets may run a half a billion dollars. On an absolute scale, that is not small.

The point I wanted to make, really, was it seems important to think about this problem in two phases:

One is, is it important to have a synthetic fuels industry of some size in being by 1985 in the national interest, even if some parts of some of those plants may turn out to be uneconomic. My own view is that it is. But that's the first bridge to cross.

But if you cross the bridge that is important to have such an industry in being by 1985, then you have to cross the bridge of how you do it, and there are a variety of ways to do that. Loan guarantees is one.

I think I agree with the underlying philosophy that you express, that in applying these kinds of guarantees we have to be within the objective of getting x million barrels production on line. You have to be pretty hard-nosed. You want to get real live commercial money into the thing too, and we don't want to put the Government in the position of guaranteeing loans, or subsidizing prices, where it ought to be done by the private sector, because it involves only normal commercial risk. It is easier to say than do, but I think it is an important philosophy in the overall administration of the program.

Mr. OTTINGER. Would the gentleman yield?

Mr. WYDLER. I will. I'll be glad, Mr. Chairman, to yield back my time.

Mr. MILFORD. A point of order, Mr. Chairman.

The CHAIRMAN. The gentleman is heard.

Mr. MILFORD. Mr. Chairman, I'm just not sure what the parliamentary situation is here. Can we amend the Senate language, or can we make motions to instruct conferees? What exactly is the parliamentary situation?

The CHAIRMAN. The conferees can make amendments. It was obvious from the discussion they wanted more information. This meeting was called for the sake of further information. It's a meeting of discussion. After this meeting there will be another meeting of the conferees, and the conferees will decide what course they want to follow. There are no motions in order.

Mr. MILFORD. We could not make a motion to instruct conferees?

The CHAIRMAN. Of course, the gentleman can always do that, under the rules of the House, but not at this time.

Mr. MILFORD. Thank you, Mr. Chairman.

Mr. HECHLER. Do I understand we'll go right from a full committee meeting very quickly into a meeting of the House conferees, which would allow no opportunity for the full committee to have an input so far as to what the House conferees are going to decide?

The CHAIRMAN. The meeting of the conferees will be arranged just the minute this meeting is over, and if the conferees want to go back to the full committee for instructions they can certainly do so, and a motion will be made on the House floor for instructions. But the conferees will make that decision at their next meeting.

Mr. HECHLER. I thank the chairman.

Mr. OTTINGER. Mr. Chairman.

The CHAIRMAN. Mr. Ottinger.

Mr. OTTINGER. Isn't it true that the majority of the ownership of coal in this country is by the major oil companies at this time?

Mr. FRI. You said, "Mr. Chairman." You're asking me?

Mr. OTTINGER. Yes; this is the thing that just looks incredible to me, on first blush. Maybe I don't understand it, but I have some of the same concerns that Mr. Wydler has. The idea of a \$6 billion program to subsidize the oil companies just is mindblowing. I mean, I understand the administration likes oil companies, but that just seems to me to be beyond the wildest dreams that anyone would ask Congress to do.

Mr. FRI. To go back to the original observation, yes, (a) a large number of coal resources are owned by oil companies, and, (b) this is the Senate's language.

The CHAIRMAN. Would you yield to me for one comment?

Mr. OTTINGER. Yes.

The CHAIRMAN. Exxon is against it. Standard Oil is against it. Union Oil is against it. Now, what that means, I don't know.

Mr. MOSHER. Could I make a comment also?

Mr. OTTINGER. You mean you're going to subsidize the oil companies, even if they don't want it?

Mr. MOSHER. Dick, can I make just a slight political footnote on that?

Mr. OTTINGER. Yes.

Mr. MOSHER. You say the administration is favoring this, and the proposal comes from Mr. Jackson and Mr. Randolph.

Mr. OTTINGER. The administration apparently is supporting this thing, and it just seems incredible.

Mr. FRI. Yes; we support it in general. I supported the idea of having, on-line, a substantial capacity of synthetic fuels plants by 1985

because I think it is terribly important to the security of this country over the balance of this country to get at least that far.

Now, I don't know who will wind up guaranteeing it, if some oil company is going to build the things, or some gas company is going to build the things, or the source, or the utilities, who are the entrepreneurs.

I think, however, there is some technical risk involved, and there is some marketing and pricing risk involved, the economics of the first plants.

If you agree that it is necessary to get something on the road by 1985, so that we have a platform to go from on to the year 2000, then I think the Government has to do something about absorbing risks that go beyond the normal commercial risk in ventures of this type.

I think that the language of this sort of a statute has to be very carefully drawn that this is the intent of Congress, to make it abundantly clear that that is the purpose of the program. But I do think that it is going to take some of that—we are talking about billion dollar plants. These are not cheapies. They are very expensive plants.

Mr. HAYES. Would the gentleman yield?

Mr. OTTINGER. Sure.

Mr. HAYES. Mr. Fri, the loan guaranty program, as I understand it, does not include the production of fuels from solid waste, which Mr. Train has indicated in a letter to us of August 8, or a letter to Mr. Thornton, that he felt that we could probably be getting about 100,000 barrels a day of oil equivalents from solid waste fuels by 1985 with a maximum of 400,000 barrels a day.

Is there any reason why the solid waste program wasn't included?

Mr. FRI. There is some dispute. There is no, as far as I know, final administration position as to whether solid waste ought to be included in this program. So I cannot answer your question.

Let me observe, however, the last time I counted there were 27 companies actively selling equipment to convert solid waste to energy, some very large companies: American Can, Libby-Owen, Ford, others who are very much in that business. That equipment is being bought for a plant being built in Saugus; Minneapolis, St. Paul is interested in it; and the problem seems to be not so much one of availability of equipment, or even availability of funds, because the equipment is not particularly expensive. The problem seems to be getting the garbage together from multiple jurisdictions, and getting contracts on it. I don't think that is a loan guaranty program. I think that is an institutional issue.

Mr. HAYES. Is there an issue at all with regard to municipalities setting up their own plants, or, for that matter, aiding in the capital acquisitions necessary for either municipalities or for utilities, whether they be municipal or private?

Mr. FRI. I don't know.

Mr. WYDLER. Would the gentleman yield to me?

Mr. HAYES. Surely.

Mr. WYDLER. I just want to add to this that in my Congressional District the local government has just bought one of these types of plants and it will be under construction shortly. So there's nothing to stop you from doing it if you want to.

Mr. OTTINGER. This indicates a problem of priorities. I would think, of just major proportions. We're told, for instance, the conservation

per barrel saved is just a whale of a lot cheaper than any kind of bringing on line of synthetic fuel oil plants, and that ERDA at the present time has a budget of \$5 million and eight staff people assigned to conservation.

Here you're talking about \$6 billion, putting \$6 billion of the Government's credit down the line to do this one particular technology that has a whale of a lot of problems with it now. I just wonder whether we ought to rush into this kind of monumental expenditure for the risk of Federal capital in just this one particular means of energy development. I think the Government has also got a tremendous commitment in the nuclear area. I wonder if we can't make a much better assessment of where the real cost-benefit ratios lie in the vital areas in question here.

Mr. FRI. Let me try to explain ERDA's priorities, at any rate, because I think that is a terribly important question, Mr. Ottinger.

We have, at the command of Congress, looked at our priorities in three time periods: to 1985, the so-called short-term, the mid-term, 1985 to 2000, and 2000 and beyond.

In the short-term we are absolutely convinced that conservation, including production of energy from waste material, is a very high priority item.

Now, what we're talking about here is what do you do between the year 1985 and the year 2000. Our calculations suggest that if one can go through a conservation exercise to improve the efficiency of energy utilization in this country with the production of energy from waste we can make major savings. But you can tighten the belt only once, and if you look at the import curves that we came up with in our plan, you see that as a result of conservation you're able to drag down imports through the year 1985 to 2000. But then, if all you do is conservation, then what happens is the imports start to grow again because you have tightened the belt, and the underlying economic growth of the country continues to demand an increase in energy.

Okay; so what that means is you wind up with what do you do for liquid and gaseous fuels in the period 1985 to 2000, because what is happening there is that you (1), a probable downturn in the availability of oil and gas naturally occurring, and, (2), a big capital infrastructure that depends on liquid and gaseous fuels. My home is heated with gas. Yours may be. Automobiles drive around on gas. We use a variety of oil for a variety of reasons. Finally, the great infinite sources of energy, like solar and fusion, and whatnot, basically produce electricity, and both because it takes a while to get those up and running and because you really have to convert the whole industrial sector to use those sources, to essentially an electric economy, you wind up with a gap, and that all cannot occur, we think, until after the year 2000 in any quantity. So you wind up with a gap in the 1985 to 2000 period where you just do not have enough liquid and gaseous fuels. Before that you tighten the belt with conservation, and that is terribly important. After that you go for things like solar energy, and that is very important. But in the mid-term you've got to do something, according to our studies, about liquid and gaseous, and the way you are going to do it is to turn coal into liquids and gases.

Okay; that is why this program is important, and that is why it has a priority, not that it is a higher priority than conservation or

solar electric. It has a priority for a specific purpose, in a specific time frame.

Mr. DOWNING. Mr. Chairman.

The CHAIRMAN. Yes.

Mr. DOWNING. Thank you, Mr. Chairman.

Mr. Fri, is the administration supporting the concept of constructing demonstration plants, or financing the construction of commercial plants, which will actually put this oil into production?

Mr. FRI. We are, of course, supporting plants that demonstrate new technology. Now, it seems that the purpose of this exercise is to build commercial scale plants probably with existing, rather than brand new, technology, but not to finance the whole industry, to finance the first plants of various types.

Mr. DOWNING. Are the plants now producing oil from coal?

Mr. FRI. There are plants that certainly produce gas. I don't know, are there liquefaction plants in operation?

Dr. GOUSE. Yes; but the quantity in this country is negligible.

Mr. FRI. The quantity is negligible. There are some overseas, in South Africa, for example.

Mr. DOWNING. Are you aware of the practice engaged in several years ago regarding the utilization of synthetic oil from coal?

Mr. FRI. Dr. Grouse tells me that's our oil, so I guess we are.

Dr. GOUSE. We work with the Navy. They test our synthetic progress in the various applications.

Mr. DOWNING. Who are you?

Mr. FRI. Dr. Gouse, sir, is the Deputy Administrator for Fossil Energy.

Mr. DOWNING. I was told that the Navy had been operating several ships on a demonstration basis where oil from coal is being used now. Is that correct?

Dr. GOUSE. The Navy has run some tests at one time or another on synthetic liquids from coal. It's not a regular operation. We don't have enough synthetic liquids to do that.

We're also running some aircraft engines on jet fuel refined from shale oil, just to understand whether these things work properly.

Mr. DOWNING. Where was this oil produced that the Navy used?

Dr. GOUSE. The one for the ship was produced in the COED Pilot Plant in Princeton, N.J.

Mr. DOWNING. That plant is actively producing oil?

Dr. GOUSE. No. That pilot plant completed all its technical objectives. It developed the information necessary to design to test scale, but is now being abandoned.

Mr. DOWNING. So the technology is here; we've got it now. Do we not?

Dr. GOUSE. The basic data to understand how the process functions was obtained for a very small plant, on the order of 20 to 30 tons of coal a day. The product was tested in a variety of applications to understand on what equipment it could be used. We have paper designs of a commercial plant. No one has ever built one. There would be considerable risk in building one.

Mr. FRI. There is one whale of a problem in scaling these very small plants to the very, very large plants.

Mr. McCORMACK. Would the gentleman yield?

Mr. DOWNING. Yes.

Mr. McCORMACK. As I recall, we had testimony on that subject before the task force in operation 4 years ago.

One of the fundamental facts that we're facing here today is that that technology to make that fuel in a pilot plant has been in existence in this country for 4 years, and nothing has been done about it, and mainly because there hasn't been any capital available to do it.

Mr. DOWNING. That's the point I'm making.

I've been talking to the top officials in the Navy, and they're talking about going this route, and they said a billion dollar plant on the west and east coast could supply their fleet with all the oil that they needed, and that they could do this within a period of 4 or 5 years.

Mr. FRI. That may be the case. If the Navy's willing to sign a contract for the production of those plants for 30 years, I suspect it would attract a certain amount of capital.

Mr. AMBRO. Mr. Chairman.

The CHAIRMAN. Yes, Mr. Ambro.

Mr. AMBRO. Mr. Chairman, I would just like to clarify the situation for myself with respect to what's happening here.

As I understand it, there is a conference with respect to the ERDA authorization. This has, as a result of Senator Randolph's amendment, supported by Senator Jackson, been tacked on to that for further discussion in the conference.

Now, there have been a host of questions raised here. There will be more, it seems to me. I don't know how this squares with the earlier proposal touted about for a \$100 billion quasi public funding for energy sources.

Questions of procedure; questions, indeed, of policy, with respect to the Government getting into this funding area, or the guaranteed area, have been raised. The report uses the phrase, "generally tight credit situation" on page 89. Maybe it's because we have no control over the Fed, or the \$4 trillion that the President says we need. There's the question of very solid expansion of oil companies in these areas.

I want to know where we are with respect to this. If, indeed, the conference agrees to tack this \$6 billion loan guaranty program onto the ERDA authorization, is it correct to assume that it will then come before the House without the ability of the House to separate this portion from the bill so that we will be voting on the ERDA authorization "Yes" or "No", up or down, thereby putting the entire authorization in jeopardy? Is that the situation?

The CHAIRMAN. I understand from the Speaker of the House that we'll have a chance to separate it in any vote.

Mr. AMBRO. Separately?

The CHAIRMAN. It was obvious in the first meeting of the conference that we were kind of voting from the blind side on this thing, and I felt we needed more information, more hearings. We did not have hearings over here, and on the Senate side, I understand, there were very short hearings, and this is just a matter of developing this whole thing. But certainly, whatever is done in the conference by the conferees, there will be a chance in the House for them to separate it.

Mr. AMBRO. There will be?

The CHAIRMAN. There will be.

Mr. HECHLER. Will the gentleman yield?

Mr. AMBRO. Yes.

Mr. HECHLER. I've never really seen a conference report where you can separate out. It's either up or down when it comes out of conference. But it seems to me personally that procedurally we ought to not abdicate here on the Science and Technology Committee our responsibility to advocate to the conference.

Mr. THORNTON. Mr. Chairman.

The CHAIRMAN. Mr. Thornton.

Mr. THORNTON. Thank you, Mr. Chairman.

First, may I say that I concur with you in your statement that there is a need for synthetic fuels capacity, notwithstanding the present economics of cost, and, in addition to the reasons that you state, that the national interests of having a base from which to build, perhaps even a 10-million-barrel a day capacity at the end of the century. Is there not also a great interest of the consumers as to how the present investment in gas-burning appliances, on the order of five to ten times the investment that the pipeline suppliers of energy have invested, in continuing to have the availability of that equipment for use?

Mr. FRI. Yes; I think so. As I said earlier, there is a great capital stock, part of it in the hands of consumers, that is all based on using oil and gas, and the notion of ripping all that stuff out and putting in electric machinery, even if we have the electric capacity, would, I think, be very traumatic and an expensive proposition to the United States if we accelerated the turnover of capital stock, consumer and otherwise, too rapidly.

Mr. THORNTON. Mr. Fri, with regard to the assumption of risk, I wanted to come back to one statement you made, and ask for some clarification, dealing with two different groups of potential investors, the regulated and nonregulated classes.

You make the statement that as to regulated investors presumably they could absorb the risk by reason of having regulated rates.

There are two factors that I think need to be mentioned. First, that construction work in progress is not allowed normally as a rate base item, and therefore, the regulated industry cannot absorb the cost of this until, and unless, it goes into place as a producing item; and, secondly, I am unaware of any regulation that requires consumers to use a product made available by regulated enterprise, and if the economics of that product are not there it would seem to me that the consumers would have the option of turning to electricity, or other uses. Is that correct?

Mr. FRI. That's right. I assume so, yes.

Mr. THORNTON. So there is no guaranteed rate. However, the suggestion that has been mentioned of having a guaranteed market might, indeed, be a very useful method for encouraging capital formation.

Mr. FRI. Yes. That is clearly a complex question. It goes back to your earlier remark, where you have a lot of people with gas stoves and gas heaters and gas water heaters, and while an increase in energy price probably would, presumably would, have the effect of changing those people potentially to some other source of energy, depending on the relative cost; it is not all going to happen at once.

So the market probably has a high degree of short-term stability, or inelasticity, but fairly high elasticity over the long-term. It would be a very complicated equation to work out what the security of regulated industry was under those circumstances.

But you are entirely right. I am sure it is going to generally drive people to lower cost energy if it is available, or use less.

Mr. THORNTON. With regard to the nonregulated borrowers, I do not know about your experience, but it has been mine that you can borrow any money from the bank that you need if you can prove absolutely you do not need it, or do not require it.

I am just wondering how difficult it might be to borrow \$1 billion from some bank to build a plant which has never been built before, and I wonder if it is in the national interests that such plants be built, in the national interests from a broad scope, and in the national interests from the viewpoint of the consumer, if, indeed, there does not need to be a mechanism for encouraging the acceptance of this risk.

Mr. FRI. It seems to me that we have a problem here that has two components to it.

One is nobody has ever built a plant. Banks get a little uneasy investing \$1 billion in something that has never been done before. Once it operates successfully, their state of mind calms down, typically.

Even if they give you a loan the first time, and you pay off, they are much more likely to give you a loan.

Mr. THORNTON. The second time it is going to be easier to finance it, is it not?

Mr. FRI. I hope so.

The other great uncertainty, of course, is the price of competitive energy, mainly the price of oil, and one has to make a speculation as to what that price is going to be. My own speculation—and it is only that—is that we probably will not see a precipitant drop, but I could very well be wrong. That has happened before. And that is an uncertainty.

So one has to face the question of given those uncertainties, which tend to drive capital away from a project, does the Government want to do something to bring a base of capacity into being in the national interests, based largely on economic reasons, or not?

Mr. THORNTON. Mr. Fri, if I may ask one more question along that line?

We are dealing here with an area where there is at least one certainty: It is uncertain at what point our reserves of natural oil and gas will be exhausted, but it is certain, is it not, that the supply is finite, and that at some point they will be depleted?

Mr. MOSHER. Will the gentleman yield? Mr. Chairman.

The CHAIRMAN. Mr. Mosher.

Mr. MOSHER. Just to follow on what Ray was saying previously, is there an implication in what you have been saying that part of the administration's package proposal will be some sort of a guaranteed market for energy, like the flour price subsidy, or that sort of thing?

Mr. FRI. That option has been considered, but I cannot tell you what is going to be in the administration's final position because I do not know.

Mr. MOSHER. I just had a feeling from the colloquy between you and Mr. Thornton that the whole proposition would not work without that.

Is there any such implication in the Senate amendment? Does the Senate amendment provide that guaranty?

Mr. FRI. No. The Nonnuclear Energy R. & D. Act contains a provision for the Administrator of ERDA to enter into price subsidy arrangements. That is already in the law. If I may say so, it is a some-

what awkward provision, because I think both the administration and Congress at the time that law was put together felt that something like that may have been needed, but it was not at all clear how to use it, and therefore the procedures are a bit awkward. But the authority already exists.

Mr. MOSHER. Does that present provision, the existing provision, cover the fossil fuel end?

Mr. FRI. Yes.

The CHAIRMAN. Mr. Myers.

Mr. MYERS. Thank you, Mr. Chairman.

Mr. Fri, in answer to the question about including solar energy, I believe your response indicated that you felt the Congress should go through a full discussion period and analysis of whether we wanted to move from a demonstration project situation to one supporting capital formation in the industry.

I have exactly the same question with regard to that which was posed before. Is it not true that now we are being asked to move from a situation where Congress agrees to support demonstration plants, to encourage capital formation for synthetic fuels? I sense some urgency, which I feel is trying to skirt that very advice you gave us regarding solar energy.

Mr. FRI. The situation here seems to be one of "in addition to," rather than "instead of."

We do have a demonstration that is designed to demonstrate second generation technology. The first demonstration plants, really large demonstration plants, were authorized by the Congress this year, and we will go ahead with that. These plants really will not be completed before the early eighties.

So what we are talking about here is building a commercial size plant, which is bigger than a demonstration plant, of building commercialized plants with available technology for the purpose of really supplying on a regular and reliable basis synthetic fuels, not to demonstrate fuel technology. It is "in addition to," rather than "instead of."

Mr. MYERS. What I was trying to get at was the correlation of the need for Congress' analysis to make such a commitment. It seems to me that on the one hand we are asking for an R. & D. analysis on whether or not we want to go to a demonstration of solar, and on the other hand, we are being asked to pass on a rather limited base of information another Senate amendment which we have not had any input on, and apparently not many Members of the Senate have had much input.

In that regard, I would have to ask you, do you feel that you are more adequately briefed and familiar with the goals of this program than the Members of Congress, so that we as copartners, in designing this program, can really be copartners without the equation of the availability of information?

Mr. FRI. I would respond, first of all, I am always hesitant to suggest to the Congress just how much consideration it should give to any of the facts, as I think that is pretty much up to you folks.

Second, I am better briefed than I have indicated, but I don't know what the administration's position is on a number of these questions, and I'm in a position of not being able to give you a position.

I would submit, however, that in general a loan guaranty program added on to the solar heating and cooling operation represents a substantial change in the character of that program and raises a lot of issues about to whom we are giving loans, householders and companies, and for what purpose would they be. These are more complex than the issue of should you add to the existing fossil fuels program a loan guaranty authority to accelerate the commercial entry of the private sector on a fairly large scale into this business.

I apologize for not being more forthcoming on the administration's position. I don't have it.

Mr. MYERS. I'm not implying that. I don't feel that you're inadequately prepared. What I'm implying is, I think, that we as individual Members of Congress are inadequate to compete with you on the basis of justifying this, and I am just asking for the reasons why we shouldn't buy a month's worth of time, when we can have an input on it.

I, as a member of the Science and Technology Committee, would think that many Members of Congress, who don't sit on the committee, are going to be wanting to know what we've learned about the project—maybe not me particularly, but other more senior Members may be asked what they know about the project—and why it should be supported, and so forth. I just don't see that we can adequately address the program.

Mr. FRI. Clearly, this has come up rather rapidly, and had not come out in this body. As the chairman has pointed out, you have not held hearings on it, and he has indicated he wants to hear more about this problem, and I think that is judicious.

I guess about the only thing I can say in response to your question is that this happens to be attached to our authorization bill, and it is now September, and there is an awful lot of other stuff in the authorization bill that we would like to get settled one way or the other, and I would hope that the basic authorization bill would move along with some expedition. The separating out of this provision for further consideration, however, I guess is up to you.

But there's absolutely no question that this is a very complicated issue and to the extent I can, and to the extent the administration can, we want to work as closely as we can to get you as fully informed on it as we can.

Mr. MYERS. In regards to previous action by this committee and by the House, we did approve demonstration plants for facilities similar to this in the earlier budget, and I was intending to ask the question—and you reflected on that already—I am surprised to hear that you would assume that we would naturally make those investments in demonstration plants even though we were making considerable investment in backing full-size commercial plants. It's just this type of question that would be raised in our minds, as to why we should continue with demonstration plants with limited capacity and technological design problems, and we're going out and saying we're going to justify 7 to 11 full commercial plants.

I would have to ask you are all of the 7 to 11 full commercial plants going to be of only one design? Who is going to pass on the acceptance of different designs, if we still have a need for demonstration plants, by the Federal Government?

Mr. FRI. The demonstration plants are meant to demonstrate the economic feasibility of second- and ultimately third- and fourth-generation technology. Any plant that would be built today, starting today, at commercial scale would use available technologies, such as the Lurgi process. These processes are European and have been in existence a long time. They are not terribly inexpensive is their principal problem.

So, at one point, one channel, you are talking about getting an industry started, which is going to have to use an old process, simultaneously developing new technologies through the demonstration projects. With some luck and creativity, it is possible that some of the second-generation components can be retrofitted into the first-generation commercial plants for a few years to increase their efficiency.

Mr. MYERS. How long do you envision it taking from inception to installation of production on commercial size plants, if we're aiming at the objectives of filling the needs between 1985 and the year 2000? How long can we wait before we start building these plants?

Mr. FRI. Dr. Gouse advises me that the period from setting the deal to first operations of commercial plants, is around 5 years.

Mr. MYERS. So I don't sense the urgency of passing fast the Senate amendment for meeting an objective of 1985.

Mr. FRI. The urgency, the immediacy, is not on the order of days, certainly, but the urgency is on the order of years, and if we're going to start this thing, I think there's wisdom in starting fairly quickly.

I really cannot, Mr. Myers, respond to your problem. Here it is, and the administration's going to cope with it and get its side together, and you folks are coping with the problem of being presented with an amendment that came over from the Senate on a very big issue. I just hope we can find a way of working together to get this thing resolved expeditiously. But it is a big issue, and it has come up suddenly. I wish it were another way.

Mr. MYERS. Thank you very much, Mr. Chairman.

The CHAIRMAN. Mr. Downing.

Mr. DOWNING. Could you identify that plant in Princeton, N.J.?

Dr. GOUSE. We called it Project COED. The word C-O-E-D meant Char Oil Energy Development. The private company doing the work was the F&C Corp.

Mr. DOWNING. What was the production of that?

Dr. GOUSE. The input was around 20 tons of coal a day, which meant something like 25 barrels. You get about 1 to 1½ barrels of oil per ton of coal in that process. That process didn't convert all the carbon to liquid. It left about half of the carbon in coal as a char to be used in the gasification process.

Mr. DOWNING. What was the cost factor in converting to commercial?

Dr. GOUSE. You mean if you wanted to commercialize that plant today?

Mr. DOWNING. Yes.

Dr. GOUSE. Since we haven't done it, and since the scaleup from the pilot plant to commercial is something between a factor of 100 and 1,000, we're really guessing. The commercial cost estimate we have today varies somewhere between \$15 and \$20-some per barrel.

Mr. MOSHER. Would the gentleman yield?

Mr. DOWNING. Yes.

Mr. MOSHER. This committee visited that plant about 4 years ago, didn't it, Mike?

Mr. McCORMACK. That is correct. We took the Energy Task Force there at that time.

Mr. DOWNING. This plant supplied oil so the Navy could operate the ship for a considerable period of time.

Dr. GOUSE. A few hours.

Mr. DOWNING. A few hours?

Dr. GOUSE. Less than a day.

Mr. DOWNING. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Milford.

Mr. MILFORD. Thank you, Mr. Chairman.

Mr. Chairman, my own reaction to this, which the Senate has raised, is to instruct our conferees to vote against the entire Senate amendment. They should be so instructed, not because we may be against the Senate amendment, but because the House simply has not had an opportunity to study this rather complex issue. We're making a substantial Federal commitment here, and yet few members, even of this committee, much less the whole House, know what's in it, or what its implications are.

But pleading in the alternative, just in case a total "no" vote in the conference would not prevail, I would then suggest that the conferees go for a starter type bill, or in other words, rather than making a \$6 billion commitment, start with a lower figure, certainly not more than \$1 billion.

Further as an alternative, the House conferees should be instructed to develop language in the conference report to insure that no guarantees through loans would be made for any purposes other than duties directly involved in the construction and operations of fuel developing, processing construction plants, and equipment. The language specifically exempts such things as community support facilities, such as schools, roads, and other community projects. There may be much other restrictive language that should be written into the act. Such matters as patent ownerships and other complex matters, that should be more closely considered before we turn something like this into law.

I just wanted to express an opinion on that.

The CHAIRMAN. The chairman would like to state that the very pertinence of this meeting is what the gentleman is talking about. It was obvious that when our conferees met, they were not ready to vote on this item, and it was not heard over here. Nobody brought it up. It wasn't brought up before the full committee. It wasn't brought up in the subcommittee. So the chairman and every member will have a chance to learn what it's all about, if he wants to.

Mr. MILFORD. Mr. Chairman, I'm suggesting, though, that we can really only learn that after some rather lengthy type hearings.

The CHAIRMAN. This is not over by a long shot.

Mr. MILFORD. And that apparently, from the input we're getting here, the other body hasn't done a great deal of investigating, and apparently two or three members have sort of put this thing together, and I, for one, under these circumstances, would have to feel compelled, if it should go to the floor—

The CHAIRMAN [interrupting]. If the gentleman had made that statement before, we would have gone through with our hearings and had all the information before we made any decision.

Mr. WIRTH. Would the gentleman yield?

The CHAIRMAN. The gentleman from Colorado is recognized.

Mr. WIRTH. Thank you, Mr. Chairman.

I want to follow up on the statement made by Mr. McCormack, that much of the technology in coal gasification and liquefaction and oil shale is in place, as pointed out by Mr. Downing's questioning, in the oil shale area in Tosco and other projects. We know a lot about the technology. But I think that there are a great number of other unresolved questions, some of which were raised in the telegram from the 10 western Governors to the chairman, which I would like to have in the record at this point in time, Mr. Chairman.

[The telegram appears on pp. 11-12.]

Mr. WIRTH. They raise a series of questions that I think point out the need for the kind of hearings that so many of the members of this committee have talked about. We have not had any hearings here, nor have there been any hearings at all on this part of the bill on the Senate side. It was tacked on at the last minute during markup.

And I would gather from your statement, Mr. Fri, that even after 7 months of study the administration does not have a firm position on a synthetic fuels program. Is that correct?

Mr. FRI. Yes. But as the chairman pointed out at the outset, we understand that we will be together by Tuesday and have a position. So we are talking about getting a decision within a few days.

Mr. WIRTH. Then what we should be able to do is to have a good period of time to look at the Administration's position, which you all have been working on for several months, and not a few days, I would think.

I think the members of the committee might also be interested in a conversation which I had with Senator Jackson last week, who also said that he agreed that there were a lot of unanswered questions, and that he felt that all of the ERDA bill could go ahead except for section 103, that we might be in a position whereby the conferees could move ahead on all the parts of the authorization except for section 103.

I wonder, then, if we might be able to come to some resolution on that by early to mid-November.

I wanted to ask the Chairman if it might be possible for there to be a resolution by the committee, our committee, assuming it would be in order, that would say that the conferees might go ahead on all of the bill except for section 103; and that then, in addition, we might go ahead on the hearings that are already scheduled on coal gasification and on oil shale, which are now scheduled for October for here and throughout the country; and that we might perhaps agree on some kind of a timetable, where we could come back with language, with recommendations, and so on, to the conferees for November. Hopefully, this would move the bill, which I think all of us are interested in doing, without having the whole bill that we've worked so hard on for a long time held up by this provision; that the conferees might vote, in other words, on all the sections except 103, and we might come back to the conferees on, say, the 10th of November, or something like that, with recommendations on this section.

Would a resolution of this type be in order at this time?

The CHAIRMAN. We hope we can move on with the rest of the bill. The Chair is certainly not going to try to move on without this committee having made up its mind which way it wants to go on this section 103.

So I would assume that we could informally, or by resolution, or a number of different ways, agree not to consider section 103, and go ahead with the rest of the bill, or just flat refuse section 103, if that's what the conferees decide they want to do.

Mr. MOSHER. Would the gentleman yield?

Mr. WIRTH. Yes.

Mr. MOSHER. I had just expressed a few moments ago to the Chairman my personal view at this point, subject to change, of course, that my preference at this point is to certainly separate this loan proposal and plan from the ERDA authorization bill.

I would hope that the Senate conferees would agree that we remove this section from the bill and go ahead and adopt the ERDA authorization, with the understanding that the committees, the relevant committees on both sides, the Senate and House, would give very rapid but thorough consideration to this proposal on its merits separately.

Mr. WIRTH. I think the problem is, if we took section 103 out altogether, it would be another year or 2 or 3 years.

Mr. MOSHER. I think we ought to act on it as rapidly as we can responsibly act on it, because I think it's terribly important. But I think it deserves consideration separate from the authorization bill, and very thorough consideration.

Mr. WIRTH. Then you would agree with me that we would not only have time to consider section 103 properly, but could do that expeditiously as well, and would not be behind in a year or 2 years.

Mr. MOSHER. That would probably be my feeling.

Mr. WYDLER. Mr. Chairman, once the bill is passed, the conferees cease to exist, so it would come back to the full committee, and not to the conferees.

Mr. WIRTH. I understand that. But there has been concern that if we took 103 out this whole approach might languish for a long period of time, and at a time when we should be stimulating the coal—

The CHAIRMAN [interrupting]. It should be obvious that the Chairman is not trying to cram this thing down anybody's throat, and is trying to give the committee a chance to solidify their thinking before any action is taken.

Mr. WYDLER. Would the gentleman yield to me?

Mr. WIRTH. Yes.

Mr. WYDLER. I'm a little bit concerned about if we break this out at this point and just take it out of the conference, then there will have to be a new bill introduced relating to it.

Are you convinced that that new bill would be referred to this committee?

The CHAIRMAN. No; I'm not. We would try to draft one that would be referred to this committee, but I have no assurance it will be referred to this committee.

Mr. THORNTON. Mr. Chairman.

The CHAIRMAN. Mr. Thornton.

Mr. THORNTON. As I understand the outline that has been suggested by you, the outline is that we would move forward as expeditiously as possible to conduct the hearings that are scheduled by subcommittees of this committee, in an effort to see if language can be arrived at which is agreeable to the committee in time for its inclusion, or consideration, in the conference on the bill which is before us, and it seems to me that that option should be preserved and that we should not just try to break this out and take the risk of deferring action on this for a long period of time.

I would like to see if we cannot move forward expeditiously enough and maybe come to an agreement that would result in this section being included, or a variation of this section being included, on the conference floor.

Mr. WYDLER. If I could, could I address a question to Mr. Fri?

This administration position that we're going to get next Tuesday, is that going to be the overall administration position on synthetic fuels, or is that going to be just the administration's position on guaranteed loans?

Mr. FRI. I hope it is the former.

Mr. WYDLER. You hope it's the former.

Mr. FRI. But I'm making no guarantees. As I say, it is a complicated issue, and it is going to go before the President, and he will make a decision, and I hope that we can give you a pretty comprehensive position by Tuesday.

The CHAIRMAN. Bob, how important is this issue? Are we talking about peanuts, or something very important to the administration, if we do something one way or the other, and how important is it that we have a loan provision?

Mr. FRI. Mr. Chairman, I think that the issue of synthetic fuels commercialization is extremely important. As I was trying to explain earlier, it is pivotal to the energy situation in this country in the last part of this century, between 1985 and 2000. It is a decision where we are talking about building, in that period of time, a truly monumental new industry, and that takes a long time, and, therefore, it is an issue that needs to be considered in not necessarily a matter of days, but I think it is one we should get behind us one way or the other and get on with, even though we're talking about the world 15 to 25 years from now. I think it is a very important issue, and it is ripe for consideration. I wish it were about 4 days riper so that I could give you more information.

The CHAIRMAN. Bob, if it becomes obvious that this is going to go on for some time, then would you people rather have it taken out of the bill and the rest of the bill made law, or would you rather we wait a little while and try to include this in the overall bill?

Mr. FRI. On that hypothetical question, Mr. Chairman, I would have to say from a purely ERDA standpoint, we sure would like to get the authorization bill passed and the appropriation actions completed and get on with our program.

I would really like to defer, though, until I see what we have on Tuesday, and how it begins to look to all of you, and how complete our story is as to whether a separation is necessary from our standpoint. It is obviously your decision whether a separation is the right course of action.

But on the hypothetical question that this thing delays everything else from 60 to 90 days, I can assure you that we would all get very nervous.

Mr. HECHLER. Mr. Chairman.

The CHAIRMAN. Mr. Hechler.

Mr. HECHLER. You indicated that—and I quote you directly—“the urgency of this particular loan guaranty provision for the production of synthetic fuels is not on the order of days.”

It seems to me that when you're dealing with a \$6 billion massive proposal that it ought to be examined by the full committee, and not simply pass the buck on to the conferees, and it's for this reason that I would feel that the appropriate subcommittees of this committee, that have already scheduled hearings on this subject for a very early date, Mr. Chairman, early enough to meet the necessary urgency within days, to insure that this is done in a responsible fashion, and to insure that, indeed, the expression that was made here that this could apply to smaller companies as well as larger ones, be written into any regulation.

I sense the gospel, according to Alexander Hamilton, in these “itty bitty” billion dollar companies that are going to be affected, and I would like to examine that point and see if, indeed, an “itty bitty” billion dollar company is a small company. I mean an “itty bitty” billion dollar loan guaranty.

I feel, second, that this decision should not be made by the House conferees themselves. I feel very strongly that the input must be made by the full Committee on Science and Technology, and the appropriate subcommittees thereof, through hearings that can be held at a very early date, to examine all angles of this proposal, and then make a quick and responsible recommendation to the full committee for action.

Mr. MILFORD. Mr. Chairman.

The CHAIRMAN. Mr. Milford.

Mr. MILFORD. Mr. Chairman, is a motion in order?

The CHAIRMAN. No, sir.

Mr. McCORMACK. Mr. Chairman.

The CHAIRMAN. Mr. McCormack.

Mr. McCORMACK. I think there are a couple of points we're missing here.

One of them is that the bill before us, as it comes to us, does include these provisions in the bill. The conferees, which are appointed by the House, not this committee, but by the House—they are servants of the House, not of this committee—must face up to this issue in this conference.

Now, this committee can take all the action in the world to advise, but its only authority is to advise in this matter, and I think that it's really important for us to keep this particular matter in context when we talk about what we should do here.

If Tuesday the administration comes in and presents a proposal to us, I think we would have ample time, as a full committee, to examine the situation. We have 5 days between now and then to think about it, to get additional information. We can schedule hearings next week, following the administration's position. We should bring in a large number of organizations and individuals who have wanted to, or indicated a desire to, or who have already made statements, to give us a chance to get a broader and deeper perspective concerning this issue.

But I think the thing we want to remember here is that we are dealing with an amendment that is already in the bill that is before the conference committee, and includes both renewable and non-renewable resources. We cannot separate that out. We must vote on it in conference, and so I think we have to answer up to those questions, and I think that by next Tuesday, after we hear the administration's position, we'll be in a much better position to make a wise decision.

Thank you.

The CHAIRMAN. The gentleman's statement reflects the feelings of the chairman.

Mr. BROWN. Mr. Chairman.

The CHAIRMAN. Mr. BROWN.

Mr. BROWN. Mr. Chairman, I was a little late and may have missed some of the earlier discussions, but I would like to ask Mr. Fri to respond to several questions.

Reference has been made to a 7-month study in this administration. I presume that is in reference to the task force, the Interagency Task Force, that has been set up in the Energy Research Council.

Mr. FRI. That is correct.

Mr. BROWN. And do I understand that the results of that study have not been finalized yet, and that it's hope to be finalized on Tuesday?

Mr. FRI. That is my understanding, and I hope that's the way it works out.

The reason I hesitate is that I simply don't know at this point, because I was gone all day yesterday, as to how the issue has been formulated in the White House. But I would hope that what we have on Tuesday is a decision supported by that study, and that information is available in that study to support it.

Mr. BROWN. The study does examine several projected levels of the synthetic fuel industry, and the methods for providing those levels, I understand.

Mr. FRI. I understand.

Mr. BROWN. And I further understand—and I may be misinformed—that the options considered were in the neighborhood of about 350,000 barrels per day out, and a million, and 1.7 million barrels per day output, but the preliminary recommendations were against the million and 1.7 and supported the 350,000 barrels per day option. Am I correctly receiving rumors on this?

Mr. FRI. Yes; you are correctly receiving the rumors. I have read that in weekly energy report, but I cannot tell you officially because it is in front of the President.

Mr. BROWN. Does the \$6 billion proposed loan guarantee relate to the 350,000-barrel-per-day option, or to the higher options?

Mr. FRI. That depends a lot on what assumptions you make. My guess is that a \$6 billion loan guarantee program would, in connection with other actions, such as price subsidies and grants, produce a larger program than 350,000 barrels a day. If the whole program were done by guarantees, it's probably on that order of magnitude.

Mr. BROWN. The text of the Senate amendment and the report related thereto, however, talks largely in terms of a million barrels per day, is that correct?

Mr. FRI. That is correct.

Mr. BROWN. So there would be some incompatibility in the administration position or the task force recommendation were for a 350,000-barrel-per-day program, with the necessary incentives and, at least what appears to be, the language of the Senate proposal, which talks in terms of a million barrels per day program.

Mr. FRI. That is possible.

Let me add, however, that whether you talk of a 350,000-barrel program or a million-barrel program, or a million/seven, or whatever, I, for one, would be reluctant to sign up everybody on the first round. I think we ought to take out a program with some phasing to it, and the first increment to that program would be, whatever the end objective was. It seems to me, the first phase would be on the order of several thousand barrels a day, and that is not a policy statement, that is a statement of prudence.

Mr. BROWN. If I'm correctly informed, that seems to be the approach of the task force, and obviously, from the comments of Mr. Milford and other members of the committee, it seems that they would consider this as a prudent option, or a prudent course to take, even if you're going to go for a larger program, that you initiate the first phase, say, in the magnitude of 350,000 barrels a day, and wait a year or two before making a larger commitment to the larger capacity.

Mr. FRI. Whatever your objective is, I think, in the sense of starting that up, maybe 350,000 is the right number, I don't know, but something in that range is the way to start, whatever you wind up with.

Mr. BROWN. Even 350,000 barrels per day capacity, if I recall the numbers correctly, would constitute a dozen or so rather substantial plants.

Mr. FRI. Eight to twelve or thereabouts, plants, depending on the mix of technologies that were introduced. It's still a pretty sizable operation. You are still talking about something in the order of \$8-plus billion worth of investment for the initial phase.

Mr. BROWN. Yes.

Mr. FRI. And that's not peanuts.

Mr. BROWN. We understand that it's not peanuts.

Thank you very much.

The CHAIRMAN. Mr. Mosher.

Mr. MOSHER. Mr. Chairman, I'm sure we all recognize that Mr. Fri has been testifying here today under a real handicap. Frequently he has had to indicate that he was speaking only for himself and not the administration. But he certainly has indicated his own personal sense of urgency, and I would like to say in public—and I know that one of the other minority conferees, Mr. Goldwater, agrees with me—that it's going to be extremely important that we know to what degree the administration, and specifically the President himself, shares that sense of urgency. I think there needs to be a public commitment from the President on that sense of urgency, and I hope it might come next Tuesday, or as soon as possible. Before we can really responsibly and intelligently act here, there has to be a commitment from the White House, as distinguished from OMB or ERDA, that the full force of the administration is behind any legis-

lation that we adopt here. We don't want the rug pulled out from under us at some step down the way.

Mr. WIRTH. Mr. Chairman.

The CHAIRMAN. Yes, Mr. Wirth.

Mr. WIRTH. I would like to ask a procedural question at this point. Is there any reason why we could not have the conferees go ahead on all but the section 103 of this?

The CHAIRMAN. Tim, the bill has been reported by subcommittee and the full committee. It has passed the House. The Senate has passed their bill, and they at the last second added this provision, and now it's a case of what the conferees decide to do, and today they're merely coming back to the full committee to seek further information.

I would hope that we might talk with the Senate group, and if it becomes obvious that we don't want this provision in conference, our conferees will turn it down. I would suspect the Senate would agree to it.

Mr. WIRTH. I was asking if, therefore, our conferees could decide to go ahead in conference with the Senate at this point and agree just to leave 103 aside while we caught up with the rest of the bill, and, as I was suggesting earlier, that the conferees could decide to go ahead with everything except section 103.

The CHAIRMAN. That is correct.

Mr. WIRTH. Leaving time for the committee and the appropriate subcommittees to hold hearings and then to advise the conferees.

The CHAIRMAN. That is correct. We can't at the moment. This question, regardless of what Mr. Hechler says about the subcommittee, and the full committee, it's on the conferees' back. It's up to them to do something.

Mr. WIRTH. Is it appropriate that we might have sort of a sense of the committee resolution, or whatever, on that?

The CHAIRMAN. Tim, that's what I'm trying to arrive at. That's the reason I called this hearing this morning. That's why I scheduled another meeting of the conferees; and maybe we'll come back to the full committee, or open hearings, or whatever the conferees decide they want to do.

Mr. HECHLER. Would the gentleman yield?

The CHAIRMAN. The gentleman from West Virginia.

Mr. HECHLER. I held up one finger to the air among the House conferees, and I would say that there's a vote right now to yield immediately to the Senate.

Mr. WIRTH. Therefore, it might be appropriate that—

The CHAIRMAN [interrupting]. I don't agree with that assumption at all.

Mr. MOSHER. Ken certainly doesn't speak for me on that.

Mr. WIRTH. Would it be appropriate, then, to have a resolution of the committee now, and maybe to have perhaps language that might help to guide the conferees?

The CHAIRMAN. A resolution is not in order now.

Let us go on trying to develop some information, and not let people be afraid that they will be confused by what they might learn.

Mr. WIRTH. I would think that what a resolution would get at would be a process whereby we might arrive at that information—something along the line we were suggesting—

The CHAIRMAN [interrupting]. I think that within the next few days we may come to the point where the gentleman would have that chance, but I would like to give the conferees a chance to make their decision. I'd like to get all the information we can.

Now, ERDA has been a very difficult question in this whole session of Congress, and this committee has diligently worked on it. Mike began with starting 8 o'clock hearings, which was never done here in Congress before, and we've done it all the way through, and we're going to have enough hearings on this question so that when the conferees go to conference with the Senate that they will know what they are doing, and know what the committee wants them to do.

Mr. AMBRO. Would the gentleman yield?

The CHAIRMAN. I'd be glad to yield.

Mr. AMBRO. Mr. Chairman, am I to understand that you are asking us today to try to gain as much insight into this proposal as we can?

The CHAIRMAN. That is exactly right.

Mr. AMBRO. Is that what you are suggesting? Well, I, for one, don't have enough background by just reading this, and a couple of things have crossed my desk yesterday to incisively penetrate the questioning, or the goals of this, through clear-cut questioning. I have a million things popping through my little mind, but I am just not able to develop the kinds of questions that permit me to make a judgment on this at the moment. I don't know how anyone else feels.

Mr. McCORMACK. If the gentleman would yield?

The Chairman has proposed hearings for next week, and so the opportunity—

Mr. AMBRO [interrupting]. That's not what the chairman just said, though. The chairman just said that this is the session which will develop for us our judgments as to whether or not to support this.

The CHAIRMAN. No, Jerry. This is just the first step going up the stairs. This is the first session of trying to learn what this is all about. I don't think anybody knew.

Mr. WIRTH. Would the Chairman yield?

The CHAIRMAN. Yes.

Mr. WIRTH. What would be the relationship between the scheduled hearings by the relevant subcommittees? There are going to be hearings on coal gasification, and there are going to be hearings on oil shale that are already scheduled for October. The schedules have been set, the Members have been contacted, and the witnesses have been contacted, invited, and so on. What would be the relationship of those hearings to the hearings which have been touched upon here that might be held next week? What would be the relationship between the two?

The CHAIRMAN. Tim, I've already instructed the staff to arrange a conferees' meeting as soon as possible this afternoon, or in the morning, and then it's up to them. It's in their lap right now.

Mr. DODD. Would the gentleman yield?

Mr. WIRTH. I yield.

Mr. DODD. Mr. Chairman, I think what we're trying to get at here—I think it's quite clear—at least it seems to me anyway, that there is

concern on the part of the membership of the committee; recognizing that this committee does not have the authority to instruct by motion the conferees how they should perform their task in conference. I think it seems clear anyway that there is concern, and there are questions about whether we should include this particular provision within the bill. In light of that, is my impression correct that the conferees, the House conferees, will not take a firm position one way or another regarding this provision until there is some indication from the full committee as to how we should proceed?

The CHAIRMAN. It's in conference now.

Mr. DODD. I understand that.

The CHAIRMAN. It's in the hands of the conferees, and they're going to meet this afternoon or tomorrow, and they will vote as to what further action they want to take on this case, and I say, as you say, that it's obvious that people are in doubt, people are questioning, and whatever action the conferees take, and my guess is, as of now, they'll want some more hearings, and want to know what the decision is of the administration.

Mr. WIRTH. The point, on what procedural fashion, and what happens if the conferees decide to hold two days of hearings and go ahead with section 103, and a majority of the committee decides that they don't want to go in that direction, but rather, want to follow a longer schedule, say, of October hearings?

The CHAIRMAN. We intend to come back from conference, and as Mr. McCormack said, we are not acting alone. We're acting for the House, and if the conferees decide to do that, which I don't think they will, we'd go to conference, and I don't agree with Mr. Hechler, with the feeling of putting his finger to the wind, that the conferees are going to be for immediate acceptance. But right now it's the decision of the conferees, and I'll give you an answer to that as soon as we can meet.

Mr. WIRTH. I certainly get a sense that most of the questioning this morning focuses on the need of this committee to hold rather extensive hearings. I, for one, would very strongly urge the conferees to decide to go ahead on all sections except 103, and to let the appropriate subcommittees, or the full committee, hold the hearings that are already scheduled, and use the information that comes out of that; to then go to conference, and, as the Senate people have said, we can wait on that final resolution until early to mid-November, and plug the results of those hearings in October into the bill in early November and pass the bill at that time, with the results that come out of the scheduled hearings in October on coal gasification and on oil shale. I would like to register that with the conferees as my very strong hope that you would move in that direction.

Thank you, Mr. Chairman.

Mr. BLANCHARD. Mr. Chairman.

The CHAIRMAN. Mr. Blanchard.

Mr. BLANCHARD. Mr. Chairman, I have one question.

Am I correct in assuming that the conference committee's deliberations could be pending for quite some time while this issue would be fully aired?

The CHAIRMAN. Yes, Mr. Blanchard.

Last year on the Veterans bill the conference pended the whole session of Congress.

As Mr. Fri has indicated, it is important to get this authorization and to get this appropriation for the sake of ERDA, and if it's necessary to separate them, then I think we ought to separate them. The conferees could sit here from now until the end of Congress and do nothing if they want to, but I certainly don't think that's what will happen. I expect to press on this as quickly as we can and get something done.

Mr. HECHLER. Mr. Chairman.

The CHAIRMAN. Mr. Hechler.

Mr. HECHLER. The staff director of the Fossil Fuels Subcommittee, Mr. Ketcham, has indicated to me privately that he strongly favors the loan guarantee provision; he's in favor of this. He's handed me this note, which indicates that there are certain problems that are involved in hearings next week, which are—No. 1: Does this allow time to assess the administration position fully, which will not be announced until next week? No. 2: Will this allow time to review administration reports, which took 7 months to prepare, the OMB reports? Further, he says, it would take time to develop the witness list, witnesses who are familiar with the problems, such as capital formation, but haven't been identified as advocates or opponents. Furthermore, a time to review alternatives which are before the Congress, such as price support, tax incentives, which some feel are adequate.

I would only say, from the staff's standpoint—I hate to inject the staff into it at this point, but I think it's a very important aspect—of an orderly process of developing with all deliberate speed, if I could use the phrase, a position that is a responsible position that this committee and the Congress can be proud of in the years ahead, when we're dealing with a \$6 billion project.

Mr. WIRTH. Would the gentleman yield?

Mr. HECHLER. I yield.

Mr. WIRTH. I think there is another point on that, in terms of the common complexities of doing this, and that is to involve as early as we can the areas that would be impacted by such a program. Again, I make reference to the 10 western Governors, who have banded together, have developed policy programs; and have indicated to us in as many ways as possible their desire to have input into this program, and to help to resolve the problems which have arisen, and are going to arise at various levels of government, with relation to the Federal Government, the State Government, county and local governments, in States like Oklahoma, Utah, and so on; and I think that is another complication that suggests a need for the kind of an input that we've been talking about through the hearings scheduled in October.

Mr. HECHLER. Mr. Chairman, I hope I can persuade you personally, and I would like to persuade the committee, that this will not unduly delay the conference, that the other urgent matters in the conference ought to be cleared away, and that we have the kind of responsible hearing on this subject, on 103, that allows early action in October, without delay to the rest of the conference.

I yield to my colleague.

Mr. WIRTH. We've been in touch with the staff of the 10 western Governors, and with a number of the Governors' offices, who have indicated

that they would be able to, over the next 6 weeks, provide us with the kind of input that they feel would be necessary, the kind of analysis that we would like to do; and a 6 weeks' frame would be adequate. What you're saying, that this would not be an undue delay of the program, but we could accomplish this by the end of October, or early November, is what I'm trying to say.

The CHAIRMAN. The Chair would like, for the sake of the record, to place in the record at this time the answers to about 20 different companies and organizations, as to whether they're for or against it, but without completely reading their statement. Then we will have a chance to read it.

The Governors: Governors of Arizona, Colorado, Montana, Nebraska, New Mexico, North Dakota, South Dakota, Utah, and Wyoming; and at this moment they say "No," until we've had hearings.

Is that your understanding of their position?

Mr. WIRTH. That is correct, Mr. Chairman. They would like to have this period of time to review this program.

The CHAIRMAN. The Environmental Policy Center here in Washington, Mr. John McCormick; they do not support the provision.

The Gary Operating Co. does not support the provision.

Exxon does not support the provision.

Union Oil Co. does not support the provision.

Standard Oil Co. does not support the provision.

The Institute of Gas Technology's president says it takes no position.

The National Resource Defense Council calls for hearings.

Koppers Co. supports the provision.

The American Gas Association supports the provision.

Texas Eastern Transmission Corp. supports the provision.

Dow Chemical Co. supports the provision.

The Oil Shale Corp. supports the provision.

I ask unanimous consent that those be placed in the record, and ask the members to consider them as they may desire.

Mr. McCORMACK. Mr. Chairman, may I suggest that the staff may want to investigate the possibility of having representatives from some of these groups here, which you have just reported, testifying before this committee next week, if possible, and state their position as to why they've taken this position?

The CHAIRMAN. Mr. Ambro.

Mr. AMBRO. I was just going to say much the same thing Mr. McCormack said. Are those letters of explanation as to why they are supporting or not supporting?

The CHAIRMAN. Yes, Jerry, they do explain, but I don't have the time today to read them, as we have to go into session at 11 o'clock.

Mr. AMBRO. I understand. Could the staff make some of those available to us?

The CHAIRMAN. I think so, yes.

Mr. AMBRO. I'm interested in some of those, particularly why those major oil companies don't support the issue.

The CHAIRMAN. Yes; it is interesting.

Mr. KRUEGER.

Mr. KRUEGER. Mr. Chairman, I appreciate the opportunity to participate in these hearings this morning.

I think that probably, to the extent that there is a consensus, that consensus is more or less clear to the conferees and this committee that there are, at any rate, some doubts that the committee would be prepared at this time to feel that it was eager to support the \$6 billion, on the basis of the things they currently know, and I think we're all looking forward to gaining further information.

But if it is not out of order, now that we've discussed for about a half an hour various procedural questions, I would like to ask a couple of questions of our witnesses here.

First, I would like to ask whether you, or ERDA generally, have some idea of what the cost of the synthetic natural gas would have to be in order to make this coal conversion economically competitive with other fuels, and what would you see as the likely cost of the resulting product that will be produced by the \$6 billion investment?

Mr. FRI. I'm looking over my shoulder at Dr. Gouse. If anybody can answer that question, he can.

Dr. GOUSE. We have a range in numbers to go from \$2.50 per Btu to \$4.50 per Btu.

Mr. KRUEGER. From \$2.50 per Btu to \$4.50 per Btu. And if I recall correctly, a million Btu's is about 1,000 cubic feet of natural gas. Currently, the FPC in its system sells natural gas interstate at 50 cents per thousand.

So we are talking about the wonders of man which will then create synthetic gas which will sell for nine times the current price of nature's natural gas, as it is regulated by the Federal Power Commission. Isn't that correct?

Dr. GOUSE. I just gave you the range in numbers. There's no way to know which number in that range.

Mr. KRUEGER. But from five to nine times.

Dr. GOUSE. I might add, though, that gas sold in intrastate commerce today is not regulated.

Mr. KRUEGER. It's about \$1.60 to \$1.90?

Dr. GOUSE. Yes.

Mr. KRUEGER. I'm aware of that. It's just interesting to me. No wonder you couldn't get a banker to support that. It does not seem to me to be very surprising.

Mr. FRI. There is a question of whether it's a wonder of man or of the Federal Power Commission. [Laughter.]

Mr. KRUEGER. I suppose that the Federal Power Commission, having existed for the last 20 years, and having used, I suppose, dubious economic judgment, I'm just anxious that we should look carefully at the \$6 billion, if we are going to invest \$6 billion to get for \$4.50 what the Federal Power Commission has taken 20 years to get up to 50 cents.

A second question I want to ask is if this sort of program would go through, would you then suppose that a sense of fairness would require that those companies that were content with plain old natural gas instead of synthetic gas would also want some sort of Federal loans for their exploration and development, so that they could perhaps bring in gas that would cost half as much as the synthetic natural gas?

Mr. FRI. That is really a decontrol question, I think.

Mr. KRUEGER. But it is a question, isn't it, of what is or is not economically competitive?

Mr. FRI. That's right.

Mr. KRUEGER. And it seems to me that if the Government is going to talk of guaranteeing loans to produce something that would cost \$4.50, when it can be gotten out of the ground at a figure of from \$1 to \$2 in the intrastate market, we're still faced with the very, very serious question of the economic viability of that sort of project, aren't we?

Mr. FRI. Yes; that is the case, obviously, in the short term. As I tried to explain earlier, in my judgment at least, what we are talking about here, at bottom, is the supply of gas and oil for liquid and gaseous fuels from the year 1985 to the year 2000. In the short term, we face very serious problems of economics. That is why these plants are not being built today.

One of the issues involved, and to me perhaps the most crucial issue, is this: Is it in the interests of this country to build a base of industry that can supply very large quantities of this stuff by the end of this century, even if the short-term economics are unfavorable, which they are? They are going to get better as time wears on, however, as you run out of natural gas.

Mr. KRUEGER. The process that you would see being used by the plants that would go into the construction if this program would go through would be what you call first-generation technology, is that right?

Mr. FRI. Pretty much existing technology.

Mr. KRUEGER. Existing technology, and thus, they are not really demonstration plants in the real sense.

Mr. FRI. They would not directly be a demonstration of new technology, in the sense that one talks about technology demonstration programs. In the case of shale oil, there are probably some retorts that have probably not been run at full scale, but which have been run at adequate scale, on which we have enough technology that there is very little technical risk from model scale up.

So basically we are not talking about technological demonstration of the type that you usually think of.

Mr. KRUEGER. If we are not talking, then, about demonstration plants with new technology, but rather about using existing technology, then our forecast about the price of the gas to be produced by these plants ought to be more accurate, really, than it would be if we were talking about uncertain technologies; that is, the \$2.50 to \$4.50 ought to be, then, presumably a reasonably accurate estimate, or more accurate estimate, than what you would suppose if you were dealing with uncertain technologies. Is that correct?

Mr. FRI. Yes; they would be more certain. How certain that is, I don't know, but it would be more certain.

Mr. KRUEGER. And when we're talking about \$2.50 to \$4.50 gas, what price coal is that consuming in order to produce the gas that can sell for \$2.50 to \$4.50?

Dr. GHOUSE. The reason there's a range is there's a geographical range of surface and underground coals, resulting in a range of from \$8 to \$20 a ton in price. There's also a range in the quality of coal, in terms of the basic energy content per ton. That's why there's a wide range in what the output cost would be.

Mr. KRUEGER. Someone earlier asked about a question of patents, for example, and the possible difficulty that might exist with patents.

If we're talking about existing technology, then would there really be any problems with patents at all, or do you think that those would just not arise?

Mr. FRI. If somebody holds patents to an existing technology, I suspect there would certainly be a question of whether those patent rights would move to the government, if the government writes a contract to somebody and writes a loan guaranty.

It is a complicated question on which I don't have a position.

Mr. KRUEGER. Perhaps, considering the state of my own knowledge, I should simply conclude my questions there and say that I, for one, as a committee member, would look forward to gaining further information in the future after the administration has completed its position on Tuesday, and I hope that the information presented to Members of this Committee from ERDA and from the administration in general would include a good deal of information about cost comparability and the economic viability of engaging in this way in a project.

Mr. FRI. I hope we can provide it. A great deal of analysis has been done there.

Mr. KRUEGER. Perhaps I would ask one further question.

When we're talking about first generation technology, are we really talking about new science and technology, or are we talking about something that ERDA, as a research and development organization, is fundamentally interested in? Is that technology far enough down the line for that, or are we talking about really the question of banking and funding of existing technology?

Mr. FRI. Certainly we're not talking about technologies that ERDA has developed and is trying to market. These technologies have been in existence before ERDA and, in general, before the Office of Coal Research got actively engaged in this program in the last few years.

Mr. KRUEGER. Mr. Chairman, that concludes my questions. Thank you.

Mr. HECHLER. Mr. Chairman, if the loan guarantees are so important a part of the development of synthetic fuels, why didn't ERDA come in and say this before the regularly established subcommittee hearings, and enable the committee to develop this in a responsible way, instead of suddenly confronting the question at 11:59?

Mr. FRI. Let me respond to that this way, Mr. Hechler: My boss' boss, the President, in his state of the Union Message, said he was very interested in the synthetic fuels program, and caused a substantial time-consuming and rather expensive study to be undertaken, which it has been, and at the conclusion of which we hope we find ourselves by Tuesday.

We are faced with this time and forum, not because the President made his decision and said you had to act in the next 2 weeks, but because the Senate wrote this provision into the bill, and it is an awkward situation.

Mr. HECHLER. It's very awkward, because the Chairman asked me a very embarrassing question a minute ago. Privately he asked me why the subcommittee didn't face up to this and come up with it so that we wouldn't be in the awkward situation we now are, which is to

accept the \$6 billion proposal without the full examination, and without the necessary public input, or the input of those who are familiar with financial markets, and have testimony by the Treasury Department and other experts, who can give us a full analysis.

Mr. FRI. I think, in the absence of our position, there is demonstrable evidence that this issue is somewhat premature, from the standpoint the schedule was on, but here it is, and it is very close to the time when the President is apparently going to have his position nailed down.

Mr. HECHLER. One more final question.

Would you see any serious impairment to the synthetic fuels program if this decision were made at the end of October or early in November?

Mr. FRI. I don't know that there would be a serious impairment. I guess my view at this point, Mr. Hechler, in absence of the administration's position, is that hopefully we will be able to address this again on Tuesday. It is an important question. If it can be worked out this way, fine. If not, we'll have to do it another way. But it is important that it be worked out in the greatest, with all deliberate, speed.

Mr. HECHLER. Thank you.

The CHAIRMAN. With one question, we'll adjourn. The other members have to go to a meeting, as well as myself.

Is the \$6 billion a magic figure? What if it was \$1 billion, or what if it was \$2 billion?

Mr. FRI. No; it is not a magic figure. I am not even sure how it was arrived at. It happens to be a figure that is probably about right, in terms of the total operation.

I have not thought this through. I am not sure that the right approach is to constrain the dollars, so much as it is the objective, that is, how much do you want to build, and there are a variety of authorities to do it. Let us look at the kind of proposition we get and control it that way.

Mr. BROWN. Mr. Chairman, would you yield at that point?

The CHAIRMAN. Yes; I'll yield for 1 minute.

Mr. BROWN. That's the point, Mr. Fri, I raised earlier that puzzles me about the \$6 billion; whether it relates to a 1-million-barrel-per-day proposed commercialization program of 350,000-barrels-per-day. It seems to me that the capital cost of a 1-million-barrel program is about \$20 billion, and the \$6 billion relates more to a 350,000 barrel-per-day program.

Mr. FRI. If everything were done through loan guarantee programs, that would be true, but different kinds of projects require different kinds of incentives, and I would guess that this size program, a loan guarantee program, in addition to other incentives that appear already to be available to us, would result in a substantially larger program than 350,000 barrels, but 350,000, as a total, might well be supported by \$6 billion worth of loan guarantees.

Mr. BROWN. With not knowing all the various components, design, incentives, or mix of incentives, that might be presented here.

Mr. FRI. That is correct.

Mr. BROWN. Including 75 percent loan guarantees, 50 percent loan guarantees, guaranteed prices, and various things of that nature, and that total mix will determine how much you need.

Mr. FRI. That is correct.

The CHAIRMAN. Thank you very much.

Mr. FRI. May I just make one closing point in one closing remark, Mr. Chairman, which I feel I have to do?

First of all, to respond to a statement that you made that we have been a problem to you this year, for which I am sorry. I hope it is all predominantly the acceleration that both the Congress and the administration have given to the Energy R. & D. program that's behind that.

The CHAIRMAN. Yes. I appreciate that, and I appreciate that you people have a problem too.

Mr. FRI. Yes. And I hope we will continue to work on this problem.

I might mention, Mr. Hechler, I am delighted that you're prepared to wait until Tuesday to see what we can present to you.

This problem did come up quickly, and given this time and place, perhaps we can handle it; perhaps we can't. I am delighted that you are prepared to wait and see.

Finally, I feel I have an obligation to restate what I said at the outset, that what I have told you today, insofar as it is consistent with our letter to Mr. Hechler, is the ERDA position. Insofar as it is not consistent, it is my personal opinion, which I have given you in an attempt to elucidate some of these issues. We do not have an administration position on them, and we sincerely hope we will have one for you on Tuesday. I appreciate your tolerance in letting me take that stand.

The CHAIRMAN. Thank you, Bob.

The committee will be in recess until the call of the Chair, and the staff will notify you when and where.

[Whereupon, the committee was adjourned at 10:37 a.m.]

LOAN GUARANTEE PROVISION, H.R. 3474 ERDA AUTHORIZATION BILL, FISCAL YEAR 1976

THURSDAY, SEPTEMBER 25, 1975

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, D.C.

The committee met, pursuant to adjournment, at 9 a.m., room 2318, Rayburn House Office Building, Olin E. Teague, Chairman of the committee, presiding.

The CHAIRMAN. The committee will come to order.

This is a hearing on loan guarantees as it relates to energy R. & D. projects.

The first witness today is Robert W. Fri, Deputy Administrator of ERDA.

STATEMENT OF ROBERT W. FRI, DEPUTY ADMINISTRATOR, ERDA

Mr. FRI. Mr. Chairman and members of the Committee, I am pleased to appear before you today on behalf of the administration to present its views on section 103 of the ERDA authorization bill which provides for loan guarantee authority for synthetic fuel and other commercial demonstration projects.

In this regard I shall further explain the relationship of this authority to the President's proposed synthetic fuels commercialization program already discussed by Frank Zarb.

Also with me today are Dr. S. William Gouse, Deputy Assistant Administrator for Fossil Energy, and Mr. Leonard Rawicz, Deputy General Counsel.

Mr. Chairman, the President supports the prompt enactment of section 103, with some changes, as an essential feature of a broad program to initiate the commercialization of synthetic fuels technology in ERDA.

This authority is needed to enable the Federal Government to offer a realistic range of incentives to private industry for an orderly development of synthetic fuels production. The synthetic fuels program, in turn, is designed to encourage the establishment of the industrial base necessary for the production of substantial amounts of clean-burning synthetic oil and gas from our domestically abundant supplies of coal, oil shale, and other resources.

The Nation needs this program to reduce our reliance on imported oil and gas and to provide less expensive energy if world oil prices rise. Without such a program, imports of petroleum will continue to rise

substantially even with increased production from the Alaskan North Slope, the Outer Continental Shelf and from enhanced oil and gas recovery techniques.

The President's synfuel commercialization program will develop the basis for, and encourage the construction of commercial demonstration facilities necessary to launch a major American synthetic fuels industry.

We cannot expect the private sector to meet these needs in the time these require without Government involvement. There are a number of serious obstacles discouraging private entry into this complex and capital-intensive field.

Uncertainty in the future price of world oil is perhaps the most important factor discouraging private investment. If world oil prices were to fall substantially, large plant investments could not be paid off from the revenues of low-priced but higher cost synthetically produced fuels.

Adding to this risk are uncertainties relating to environmental regulations, the complex economics of building full-scale synfuels facilities, and the adequacy of available labor and materials.

At the same time, it is clear that significantly reduced reliance on imported petroleum requires the establishment of a major U.S. synthetic fuels industry, capable of production of about 5 million barrels per day equivalent by 1995 and 10 million by the year 2000.

Because of the long leadtimes and the technical complexities involved, this means that we must begin now to establish the basis for steady growth of this industry in the 1980's and the 1990's.

The administration has had, as you know, under study for some months a number of alternatives for launching an effective synthetic fuels commercialization program. A draft of this study has been made available to the committee. The study forms the basis for the major initiatives contained in the President's synthetic fuels commercialization program.

Briefly stated, the President's program envisions an initial effort aimed at developing approximately 350,000 barrels per day of oil-equivalent capacity which could then be increased to 1 million barrels per day by 1985.

The initial level of 350,000 would provide essential information and data to clarify the many uncertainties surrounding the scale up of the several processes likely to be used by the synfuels industry.

This level of effort will minimize Federal risk while still providing the necessary magnitude and mix of synthetic fuels processes necessary for early assessment of the scale-up economics, the environmental and social issues, as well as the overall industrial response to the initial phase of the program.

A sound information base will then be established for determining the best ways to proceed toward the 1 million barrel per day goal by 1985.

The type of initial program envisioned can be seen by examining the anticipated startups from 1976 through 1978:

For production of synthetic oil—two shale oil plants and one syncrude plant, each producing 50,000 barrels per day.

For production of synthetic gas—two high-Btu gas plants, each producing 40,000 barrels per day, equivalent.

For production of electric utility and industrial fuels—three low- and medium-Btu and boiler fuel plants each producing 25,000 barrels per day equivalent and four biomass conversion plants, each producing 6,000 barrels per day equivalent.

The environmental and social problems associated with a 350,000-barrel-per-day program will be of vital concern, but should be fully manageable. Federal, State, and local regulations concerning the environment, land use, health and safety, and the use of public lands and minerals must and will be strictly observed.

To this end an environmental protection strategy is included as an integral part of the recommended program. A draft programmatic environmental impact statement has been completed as an integral part of the proposed program. Extensive environmental research and data gathering will be conducted in conjunction with the implementation of the program.

Health and environmental data and environmental control technology must be developed concurrently with the commercialization program. Adequate Federal funding for that purpose is necessary.

Environmental uncertainties include concern over effluent production, pollutant effects, plant siting, waste disposal, and esthetics. An extensive, though preliminary, analysis has shown the need for improved emission controls, monitoring of suspected toxic materials, measurements of effluent water quality, wildlife protection, revegetation and reclamation.

Because there can be no assurance of adequate industry development in this time frame without Federal encouragement, the President's program proposes a carefully selected mix of incentives designed to get the job done with minimal cost to the Government. The administration believes that a realistic program of incentives should include authority in ERDA for loan guarantees, price supports and construction grants.

For example, loan guarantees would be an attractive incentive for construction of regulated high-Btu synthetic gas plants. Also, loan guarantees in combination with price supports would make possible the construction of syncrude and shale oil plants in the private sector. And construction grants may be needed to spur the construction of synthetic electric utility fuels subject to regulatory controls.

While we believe each of these incentives is needed to launch a successful synthetic fuels industry in this country by 1985, we are here today to focus in detail on the loan guarantee authority as contained in section 103 of the ERDA authorization bill, as passed by the Senate.

Additional legislation for the authorization-appropriation of price supports and construction grants will be transmitted to Congress shortly, although I might add we believe we have the organic authority for those actions today.

With specific regard to loan guarantees, the President's program recommends that the Government guarantee only a portion of loans for project costs. The percentage of the loan to be guaranteed would be established by open competition among potential participants. This procedure will reduce the taxpayer's risk should the project fail.

By the same token, the Government would not spend any loan guarantee money if all the plants succeed. And, while the Federal loan guarantee authority that we are supporting permits participation by

the Federal Government up to 75 percent of the total projects costs, utilization of the full amount would be permissive, not mandatory.

In addition, to meet the needs of this program, we recommend the following major changes to section 103 of the loan guarantee provision of S. 598 as passed by the Senate:

Provisions authorizing loan guarantees for facilities deriving energy from renewable sources should be deleted.

Clarifying language should be added which would establish that this section authorizes loan guarantees for commercial scale facilities where such facilities are for such demonstration purposes.

Modifications to the recourse provisions which could be used in case of default to insure that the assets of the parent company would not be at risk and only the assets of the project involved could be taken by the Government.

An extension from 90 days to 180 days for ERDA to submit a report to the Congress on its recommendations for this program.

A reduction in the time from 90 to 30 days that a report on each loan guarantee must be presented to Congress before a guarantee can be finalized.

A provision which permits the Government to make immediate payments in the event of the default of a guaranteed loan.

And, finally, a number of technical changes are recommended, such as: Prohibitions against loan guarantees for tax-exempt entities, authority to charge fees, a time limit for the loans which may be guaranteed, and a designated period in which ERDA may exercise this authority.

These and other proposed modifications are incorporated in our suggested language changes for section 103 which I would like at this time to submit for the record, Mr. Chairman.

The CHAIRMAN. That will be done.

[The suggested modifications follow:]

SEC. 103. LOAN GUARANTEE PROGRAM FOR SYNTHETIC FUELS—(a) It is the purpose of this section to—

(1) Provide adequate Federal support to foster a joint government and industry commercial demonstration program capable of leading to the production of an equivalent of one million barrels of oil per day from coal, oil shale and other domestic energy resources.

(2) Authorize loan guarantees for the construction of commercial demonstration facilities for the conversion of domestic coal, oil shale and other domestic energy resources into synthetic fuels.

(3) Further the national energy policies enunciated in the Federal Non-nuclear Energy Research and Development Act of 1974 (88 Stat. 1878; 42 U.S.C. 5901 et seq.).

(b) (1) The Administrator is authorized, in accordance with the provisions of this section, and such rules and regulations as he shall prescribe after consultation with the Secretary of the Treasury, to guarantee and to make commitments to guarantee in such a manner and subject to such conditions as he deems appropriate, not inconsistent with the conditions of this section, the payment of interest on, and the principal balance of, bonds, debentures, notes, and other loan obligations issued by or on behalf of any person for the purpose of financing the construction of commercial demonstration facilities for the conversion of domestic coal, oil shale and other domestic energy resources into synthetic fuels, including but not limited to, such synthetic fuels from coal as high-Btu gaseous fuels compatible for mixture and transportation with natural gas by pipeline, low-Btu gaseous fuels suitable for boiler use in compliance with applicable environmental requirements, liquid fuels for transportation uses, and petrochemicals; Provided that the outstanding indebtedness guaranteed and committed to be guaranteed under this section at no time shall exceed \$6,000,000,000 and that

the authority to enter into commitments shall expire September 30, 1980; and that the authority to guarantee shall expire two years thereafter.

(2) An applicant for a loan guarantee under this section shall provide information to the Administrator in such form and content as the Administrator deems necessary. Each guarantee and commitment of guarantee shall be extended in such form, under such terms and conditions, and pursuant to such regulations as the Administrator deems appropriate.

(c) The Administrator with due regard for the need for competition shall guarantee or make a commitment to guarantee under subsection (b) only if—

(1) The Administrator is satisfied that the financial assistance applied for is necessary to encourage financial participation by private lenders or investors;

(2) The amount guaranteed does not exceed 75 per centum of the total project cost as determined by the Administration;

(3) Loans guaranteed shall provide for complete amortization within a period not to exceed 25 years, or 90 percent of the useful economic life of the physical assets financed as determined by the Administrator, whichever is less. Loans guaranteed may not be subordinated to any other long term financing.

(4) The Administrator has determined that there will be a continued reasonable assurance of full repayment.

(d) Except in accordance with reasonable terms and conditions contained in a written contract of guarantee, no guarantee entered into by the Administrator pursuant to this section shall be terminated, canceled, or otherwise revoked. Such a guarantee shall be conclusive evidence that the underlying obligation is in compliance with the provisions of this section and that such obligation has been approved and is legal as to principal, interest, and other terms. Subject to the conditions of the guarantee contract, such a guarantee shall be incontestable in the hands of the holder of the guaranteed loan except as to fraud, or material misrepresentation.

(e) (1) If there is a default as defined in regulations promulgated by the Administrator by the obligor, the holder of an obligation or his agents have the right to demand payment of any unpaid amount from the Administrator. Within such period as may be specified in the guarantee or related agreements, the Administrator shall pay to the obligee or his agent the unpaid interest on and unpaid principal of the obligation guaranteed by the Administrator as to which the obligor has defaulted, unless the Administrator finds that there was no default by the obligor in the payment of interest or principal or that such default has been remedied. Nothing in this section shall be construed to preclude any forbearance for the benefit of the borrower which may be agreed upon by the parties to the guaranteed loan and approved by the Administrator.

(2) If the Administrator makes a payment under paragraph (1) of this subsection, he shall have all rights specified in the guarantee or related agreements including where appropriate the authority, notwithstanding any other provision of law, to complete, maintain, operate, lease, sell, or otherwise dispose of any property acquired pursuant to such guarantee or related agreements.

(f) Loans shall not be guaranteed if they bear interest (exclusive of guarantee fees and service charges) at rates that the Administrator determines to be excessive, taking into account the range of rates for comparable loans in the private market and the risks assumed by the United States.

(g) The Administrator shall charge and collect fees in amounts sufficient in his judgment to cover administrative costs and probable losses on guaranteed loans, but not to exceed 1% per annum of the outstanding indebtedness.

(h) No loan shall be guaranteed if the income from such loan is excluded from gross income for the purposes of Chapter 1 of the Internal Revenue Code of 1954, or if the guarantee provides significant collateral or security, as determined by the Administrator, for other obligations the income from which is so excluded. Guarantee contracts shall provide for termination of the guarantee in the event of acquisition of the loan by or on behalf of, an issuer of tax-exempt securities.

(i) Guarantees may not be extended to third party lessors for the purpose of guaranteeing tax-sheltered leverage lease income. Long-term leases may not be guaranteed directly or indirectly except when determined by the Administrator, with the approval of the Secretary of the Treasury, to be of substantial benefit to the Government, taking into consideration loss of potential tax revenues as well as reduction of risk to the Government.

(j) (1) The Administrator is directed to submit a report to the Congress within one hundred eighty days of enactment of this section setting forth his recommendations on the best opportunities to implement a program of Federal financial assistance with the objective of demonstrating production of the equivalent of one million barrels of oil per day by synthetic fuels processes by 1985 utilizing the authority set forth in this section and other forms of Federal assistance provided for in the Federal Nonnuclear Energy Research and Development Act of 1974 (88 Stat. 1878; 42 U.S.C. 5901 et seq.).

(2) The Administrator is directed to submit a complete report to the appropriate committees of the Congress on any proposed guarantee and such guarantee or commitment to guarantee shall not be finalized under the authority granted by this section prior to the expiration of thirty calendar days (not including any day on which either House of the Congress is not in session because of an adjournment of more than three calendar days to a day certain) from the date on which the Administrator's report on the proposed guarantee or commitment to guarantee is received by the Congress.

(k) (1) There is hereby created within the Treasury a separate fund (hereafter in this section called "the fund") which shall be available to the Administrator without fiscal year limitation as a revolving fund for the purpose of this section.

(2) There are authorized to be appropriated to the fund from time to time such amounts as may be necessary to carry out the purposes of this section. All amounts received by the Administrator as interest payments or repayments of principal on loans, fees, and any other moneys, property, or assets derived by him from his operations in connection with this section shall be deposited in the fund.

(3) All loans, expenses, as appropriate, including reimbursements to other government accounts, and repayments pursuant to operations of the Administrator under this section shall be paid from the fund. If at any time the Administrator determines that moneys in the fund exceed the present and any reasonably prospective future requirements of the fund, such excess may be transferred to the general fund of the Treasury.

(4) If at any time the moneys available in the fund are insufficient to enable the Administrator to discharge his responsibilities under guarantees under this section, he shall issue to the Secretary of the Treasury notes or other obligations in such forms and denominations, bearing such maturities, and subject to such terms and conditions, as may be prescribed by the Secretary of the Treasury. This borrowing authority shall be effective only to such extent or in such amounts as are specified in appropriation acts. Redemption of such notes or obligations shall be made by the Administrator from appropriations or other moneys available under subsection (k) (2) of this section. Such notes or other obligations shall bear interest at a rate determined by the Secretary of the Treasury, which shall be not less than a rate determined by taking into consideration the average market yield on outstanding marketable obligations of the United States of comparable maturities during the month preceding the issuance of the notes or other obligations. The Secretary of the Treasury shall purchase any notes or other obligations issued hereunder and for that purpose he is authorized to use as a public debt transaction the proceeds from the sale of any securities issued under the Second Liberty Bond Act and the purpose for which securities may be issued under that Act are extended to include any purchase of such notes or obligations. The Secretary of the Treasury may at any time sell any of the notes or other obligations acquired by him under this subsection. All redemptions, purchases, and sales by the Secretary of the Treasury of such notes or other obligations shall be treated as public debt transactions of the United States.

EXPLANATION OF PROPOSED CHANGES TO SECTION 103 OF S. 598 (LOAN GUARANTEE PROGRAM FOR SYNTHETIC FUELS)

(1) Section 103 of S. 598 has been revised to delete loan guarantee authority for facilities utilizing "renewable energy sources" (e.g., geothermal, solar, wind). Certain of the authority in this section already is available in the geothermal area under the Geothermal Energy Research, Development and Demonstration Act of 1974, and the Congress has already expressed its preferred approach for accelerating the introduction of solar technology through the Solar

Heating and Cooling Demonstration Act of 1974. In addition, many of the technologies for utilizing other renewable energy sources have not yet reached the stage of development where commercial quantities of power and heat could be economically generated by facilities suitable for loan guarantee support. However, to broaden the scope of the resources which can be used to develop synthetic fuels, the section has been clarified so that synthetic fuels can be developed from "other energy resources" in addition to coal, and oil shale. These "other energy resources" might include waste material.

(2) Subsections (a) (1), (a) (2), and (b) (1) have been revised to make clear that the program involves a commercial demonstration effort or the application of technology and commercial scale to demonstrate technical and economic feasibility. The program would thus permit the demonstration of commercial-size facilities for the production of synthetic fuels.

(3) Subsection (b) (1) has been revised to make clear that the Administrator would consult with the Secretary of the Treasury concerning general rules and regulations prescribed to administer the program. The subsection as presently worded appears to require consultation with the Secretary of the Treasury on each individual guarantee. This would be administratively burdensome and unnecessary.

(4) Subsection (a) (2) and (b) (1) have been revised so that the loan guarantees would cover only project costs for development and start-up and not the ongoing operational costs (maintenance, labor, etc.) of running the plant facilities.

(5) Subsection (b) (1) has been revised by the deletion of the requirement that up to \$2.5 billion of guarantees would be available for projects to produce high-Btu gaseous fuel compatible for mixture and transportation with natural gas pipeline. The retention of such a requirement would unnecessarily restrict needed administrative flexibility in determining the number, size and amount of loan guarantees for plants of this type. This can be precisely determined only after proposals have been made by private industry. Also, this subsection has been revised to limit the authority to enter into guarantee commitments until September 1980. This will provide a reasonable time frame for implementation of the program's loan guarantee authorization.

(6) Changes have been made to subsection (b) (2) to provide needed flexibility with regard to the information the Administrator might require from private sector participants. Such flexibility is essential since the USG role is providing only incentives to the private sector to encourage the building of commercial scale plants.

(7) Subsection (b) (3) has been deleted because such details as are contained in the subsection could be covered in regulations and individual loan guarantee documents.

(8) Subsection (c) (1) has been revised to clarify the Administrator's responsibilities for competition in the execution of this program.

(9) Subsection (c) (2) (now (c) (1)) has been revised to delete the reference to the Secretary of the Treasury. The Secretary would be involved in promulgation of the general regulations and would be consulted on an overall implementation schedule. There is no need to involve him directly in the process of making individual loan guarantees.

(10) Subsection (c) (3) (now (c) (2)) has been revised so that the amount guaranteed would be limited to no more than 75% of total project costs. The Administration feels that the private sector should have a financial commitment to the project of at least 25% or more of the project costs. This would assure that private investment has been made at the onset and during each stage of the project.

(11) A new subsection (c) (3) has been added to place certain additional restrictions on the loan guarantees. The limitation of the term of the guarantee to 25 years or 90% of the useful economical life of the project would assure that the terms of the loan guarantee are based upon prudent business considerations.

(12) Subsections (d), (e) (1), and (e) (2) have been revised so as to provide the Administrator with flexibility in determining the terms and conditions governing the loan guarantee program. The Administrator would be required to issue regulations in this area and make specific determinations in each loan guarantee contract.

(13) Subsection (e) (3) has been deleted because it might be interpreted to permit the Attorney General to have "recourse" against project assets as well

as the underlying assets of any parent corporation if the entity operating the plant project is a subsidiary to a parent corporation. The Administration is convinced that if the assets of a parent corporation are subject to recourse upon default, such borrowers would not participate in the program.

(14) Subsections (f), (g), (h) and (i) are technical provisions that are necessary to protect the government's interest. Subsection (f) requires that the interest rates be reasonable and not excessive when compared to those in the private sector before a loan is guaranteed. Subsection (g) requires the Administrator to charge fees to cover administrative costs and probable defaults on guaranteed loans. (The fees cannot exceed 1 percent per year on the outstanding indebtedness). Subsection (h) provides that no loans should be guaranteed if the income from such loan is excluded from gross income under the Internal Revenue Code. This restriction would preclude granting loans to municipalities which presently benefit from the nontaxable nature of their securities. Subsection (i) requires that a loan guarantee may not be extended to third party lessors for the purpose of guaranteeing tax-sheltered leverage lease income. This would help assure that the project owner is also the operator.

(15) Subsection (f) (1) (now (j) (1)) requires a report by the Administrator to Congress within 90 days of enactment of the section. This period is too short and should be extended to 180 days.

(16) Subsection (f) (2) (now (j) (2)) would require the Administrator to submit a report to Congress on each proposed guarantee. The 90-day period before any guarantee can be finalized should be reduced to 30 days in the interest of expediting and making more efficient the management of the program.

(17) Subsection (k) is essentially a standard provision for loan guarantee programs which establishes a revolving fund in the Treasury to facilitate the handling of revenues and payments of an administrative or loan default nature. This authority would provide the necessary confidence to prospective lenders about the Administrator's ability to pay should a guaranteed loan be default.

Under this arrangement, any deficiency in the revolving fund would be covered by providing the Administrator with the authority to borrow funds from the Secretary of the Treasury. This borrowing authority would be subject to Appropriation Acts of Congress consistent with the requirements of the Budget Reform Act. Borrowings by the Administrator from the Secretary of the Treasury would then be repaid via the Administrator's requesting necessary appropriations from the Congress.

Mr. FRI. We will be glad to explain them in further detail and render any assistance the committee desires.

While we must design the loan guarantee authority with the possibility in mind that not all synfuels projects will be successful, the actual probability of such failure is considered to be low, since the technology that is likely to be employed has been verified at the pilot plant and/or demonstration scale. Indeed, commercial facilities for producing synthetic fuels from coal were in operation in Germany during World War II.

There are 16 commercial plants in Europe and Africa currently making medium-Btu gas. Production of high-Btu gas has also been achieved at multiple sites. The technical uncertainty regarding whether or not the plants will operate satisfactorily is much smaller than the uncertainty surrounding future world oil prices, policies regarding imports, delays in construction, and environmental problems.

Synfuel plants have never been built at the scale or size required by the demands of our present situation, and thus this commercial-size demonstration program is essential to the resolution of uncertainties of these first-of-a-kind plants.

In summary, Mr. Chairman, we have been working many months to determine what needs to be done to accelerate the essential development of a synthetic fuel capability in the United States. The program

I have reviewed for you this morning is the product of that effort. We believe the program will—

Initiate a U.S. synthetic fuels industry by demonstrating available and forthcoming technology at a commercial scale, and gaining early environmental, economic, institutional and technical information on large-scale plants;

Increase domestic energy production and thereby reduce reliance on energy imports, and produce less expensive supplies if world oil prices continue to rise;

Improve the U.S. international position in energy matters by demonstrating U.S. capability to tap its vast resources, and establishing U.S. technological leadership in synthetic fuels production among energy-consuming nations;

Provide answers to the nontechnical problems associated with synthetic fuels so that commercialization can be at the required level by 1985 as ERDA's research and development program moves the technology forward into the 1990's; and

Provide a selective mix of financial incentives primarily in the areas of loan guarantees, price supports, and construction grants necessary to assure a significant thrust by the private sector toward achievement of a 1 million barrel synthetic production in 1985 and even greater expansion in the 1990's.

The Congress will soon receive the additional proposed legislation needed for this program. The loan guarantee authority is before you now, and it has passed the Senate. We need this authority to mount an effective synthetic fuels commercialization program.

We urge you to seize this opportunity at this time and place, to enact this authority in ERDA so that we may proceed with launching this vital national effort.

Thank you. My colleagues and I will now be glad to respond to any questions you might have, Mr. Chairman.

[The prepared statement of Mr. Fri follows:]

STATEMENT OF ROBERT W. FRI, DEPUTY ADMINISTRATOR, U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION, SEPTEMBER 25, 1975

Mr. Chairman and members of the committee, I am pleased to appear before you today on behalf of the administration to present its views on section 103 of the ERDA authorization bill which provides for loan guarantee authority for synthetic fuel and other commercial demonstration projects. In this regard I shall further explain the relationship of this authority to the President's proposed Synthetic Fuels Commercialization Program already discussed by Frank Zarb. Also with me today are Dr. S. William Gouse, Deputy Assistant Administrator for Fossil Energy and Mr. Leonard Rawicz, Deputy General Counsel.

Mr. Chairman, the President supports the prompt enactment of Section 103, with some changes, as an essential feature of a broad program to initiate the commercialization of synthetic fuels technology in ERDA.

This authority is needed to enable the Federal Government to offer a realistic range of incentives to private industry for an orderly development of synthetic fuels production. The synthetic fuels program, in turn, is designed to encourage the establishment of the industrial base necessary for the production of substantial amounts of clean-burning synthetic oil and gas from our domestically abundant supplies of coal, oil shale and other resources.

The Nation needs this program to reduce our reliance on imported oil and gas and to provide less expensive energy if world oil prices rise. Without such a program, imports of petroleum will continue to rise substantially even with increased production from the Alaskan North Slope, the Outer Continental Shelf,

and from enhanced oil and gas recovery techniques. The President's Synfuel Commercialization Program will develop the basis for, and encourage the construction of commercial demonstration facilities necessary to launch a major American synthetic fuels industry.

We cannot expect the private sector to meet these needs without Government involvement. There are a number of serious obstacles discouraging private entry into this complex and capital intensive field. Uncertainly in the future price of world oil is perhaps the most important factor discouraging private investment. If world oil prices were to fall substantially, large plant investments could not be paid off from revenues of low-priced but higher cost synthetically-produced fuels. Adding to this risk are uncertainties relating to environmental regulations, the complex economics of building full-scale synfuels facilities, and the adequacy of available labor and materials.

At the same time, it is clear that significantly reduced reliance on imported petroleum requires establishment of a major U.S. synfuels industry capable of production of about 5,000,000 barrels per day (equivalent) by 1995 and 10,000,000 by the year 2000. Because of the long lead times and technical complexities involved, this means we must begin now to establish the basis for steady growth of this industry in the 1980's and 1990's.

The Administration has had under study for some months a number of alternatives for launching an effective synthetic fuels commercialization program. A draft of this study has been made available to the Committee. The study forms the basis for the major initiatives contained in the President's Synthetic Fuels Commercialization Program.

Briefly stated, the President's program envisions an initial effort aimed at developing approximately 350,000 barrels per day of oil-equivalent capacity which could then be increased to 1,000,000 barrels per day by 1985. The initial level of 350,000 would provide essential information and data to clarify the many uncertainties surrounding the scale-up of the several processes likely to be used by the synfuels industry. This level of effort will minimize Federal risk while still providing the necessary magnitude and mix of synthetic fuels processes necessary for early assessment of the scale-up economics, the environmental and social issues, as well as overall industry response to the initial phase of the program. A sound information base will then be established for determining the best ways to proceed toward the 1,000,000 barrel per day goal by 1985.

The type of initial program envisioned can be seen by examining the anticipated start-ups from 1976 through 1978:

For production of synthetic oil—2 shale oil plants and 1 syncrude plants (1979-80) each producing 50,000 barrels per day.

For production of synthetic gas—2 high-BTU gas plants each producing 40,000 barrels per day (equivalent).

For production of electric utility and industrial fuels—3 low and medium-BTU and boiler fuel plants each producing 25,000 barrels per day (equivalent) and 4 biomass conversion plants each producing 6,000 barrels per day (equivalent).

The environmental and social problems associated with a 350,000 barrel per day program will be of vital concern but should be fully manageable. Federal, state and local regulations concerning the environment, land use, health and safety, and the use of public lands and minerals must and will be strictly observed. To this end, an environmental protection strategy is included as an integral part of the recommended program. A draft programmatic environmental impact statement has been completed as an integral part of the proposed program. Extensive environmental research and data gathering will be conducted in conjunction with the implementation of the program. Health and environmental data and environmental control technology must be developed concurrently with the commercialization program. Adequate Federal funding for that purpose is necessary.

Environmental uncertainties include concern over effluent production, pollutant effects, plant siting, waste disposal, and aesthetics. An extensive, though preliminary, analysis has shown the need for improved emission controls, monitoring of suspected toxic materials, measurements of effluent water quality, wildlife protection, revegetation and reclamation.

Because there can be no assurance of adequate industry development in this time-frame without Federal encouragement, the President's program proposes a carefully selected mix of incentives designed to get the job done with minimal cost to the Government. The Administration believes that a realistic program of incentives should include authority in ERDA for loan guarantees, price supports

and construction grants. For example, loan guarantees would be an attractive incentive for construction of regulated high-BTU synthetic gas plants. Also, loan guarantees in combination with price supports would make possible the construction of syncrude and shale oil plants in the private sector. And, construction grants may be needed to spur the construction of synthetic electric utility fuels subject to regulatory controls.

While we believe each of these incentives is needed to launch a successful synfuels industry in this country by 1985, we are here today to focus in detail on the loan guarantee authority as contained in Section 103 of the ERDA Authorization Bill. Additional legislation for the authorization/appropriation of price supports and construction grants will be transmitted to Congress shortly.

With specific regard to loan guarantees, the President's program recommends that the Government guarantee only a portion of loans for project costs. The percentage of the loan to be guaranteed would be established by open competition among potential participants. This procedure will reduce the taxpayer's risk should the project fail. By the same token, the Government would not spend any loan guarantee money if all the plants succeed. And, while the Federal loan guarantee authority that we are supporting permits participation by the Federal Government up to 75 percent of the total project costs, utilization of the full amount would be permissive, not mandatory.

In addition, to meet the needs of this program, we recommend the following major changes to Section 103 of the loan guarantee provision of S. 598 as passed by the Senate:

Provisions authorizing loan guarantees for facilities deriving energy from renewable sources should be deleted.

Clarifying language should be added which would establish that this Section authorizes loan guarantees for commercial scale facilities where such facilities are for such demonstration purposes.

Modifications to the "recourse" provisions which could be used in case of default to insure that the assets of the parent company would not be at risk and only the assets of the project involved could be taken by the Government.

An extension from 90 days to 180 days for ERDA to submit a report to the Congress on its recommendations for this program.

A reduction in the time from 90 to 30 days that a report on each loan guarantee must be presented to Congress before a guarantee can be finalized.

A provision which permits the Government to make immediate payments in the event of the default of a guaranteed loan.

Finally, a number of technical changes are recommended, such as, prohibitions against loan guarantees for tax-exempt entities, authority to charge fees, a time limit for the loans which may be guaranteed, and a designated period in which ERDA may exercise this authority.

These and other proposed modifications are incorporated in our suggested language changes for Section 103 which I would like at this time to submit for the record. We will be glad to explain them in further detail and render any assistance the Committee desires.

While we must design the loan guarantee authority with the possibility in mind that not all synfuels projects will be successful, the actual probability of such failure is considered to be low since the technology that is likely to be employed has been verified at the pilot plant and/or demonstration scale. Indeed, commercial facilities for producing synthetic fuels from coal were in operation in Germany during World War II. There are 16 commercial plants in Europe and Africa currently making medium-BTU gas. Production of high-BTU gas has also been achieved at multiple sites. The technical uncertainty regarding whether or not the plants will operate satisfactorily is much smaller than the uncertainty surrounding future world oil prices, policies regarding imports, delays in construction, and environmental problems. Synfuel plants have never been built at the scale or size required by the demands of our present situation. Thus, this commercial-size demonstration program is essential to the resolution of uncertainties of these first-of-a-kind plants.

In summary, Mr. Chairman, we have been working many months to determine what needs to be done to accelerate the essential development of a synthetic fuel capability in the United States. The program Mr. Zarb and I have reviewed for you this morning is the product of that effort. We believe the program will:

Initiate a U.S. synthetic fuels industry by: Demonstrating available and forthcoming technology at a commercial scale, and gaining early environmental, economic, institutional and technical information on large-scale plants;

Increase domestic energy production and thereby: Reduce reliance on energy imports, and produce less expensive supplies if world oil prices continue to rise;

Improve the U.S. international position in energy matters by: Demonstrating U.S. capability to tap its vast resources, and establishing U.S. technological leadership in synfuels production among energy consuming nations;

Provide answers to the non-technical problems associated with synthetic fuels so that commercialization can be at the required level by 1985 as ERDA's research and development program moves the technology forward into the 1990's.

Provide a selective mix of financial incentives primarily in the areas of loan guarantees, price supports, and construction grants necessary to assure a significant thrust by the private sector toward achievement of 1,000,000 barrels (equivalent) of synthetic production in 1985 and even greater expansion in the 1990's.

The Congress will soon receive the additional proposed legislation needed for this program. But loan guarantee authority is before you now, and it has passed the Senate. We need this authority to mount an effective synthetic fuels commercialization program. We urge you to seize this opportunity at this time and place, to enact this authority in ERDA so that we may proceed with launching this vital national effort.

Thank you. My colleagues and I will now be glad to respond to any questions you may have.

The CHAIRMAN. Bob, your statement that Congress will receive the proposal—can you give us anything more definite than that? We've got seven subcommittees going up here all the time, and we have really had a scheduling problem.

Mr. FRI. As I understand that, Mr. Chairman, the additional legislation that we will be submitting is largely of a general authorization appropriation character, and it should be up within the next week?

The CHAIRMAN. Within the next week?

Mr. FRI. Yes. These are largely implementing kinds of requests. For example, we are requesting specific appropriation levels for the authorization which is already contained in the Non-Nuclear Act.

So, none of these I think will involve—or I am quite sure that none will involve—a new authority of the type of loan guarantees which have not been discussed before.

Mr. HECHLER. Following up the Chairman's question, it seems to me there's a very direct relationship between loan guarantee provisions that we are considering and this as-yet-unseen new legislation on price supports and construction grants, because as I understand it these are going to be a mix of incentives.

Mr. FRI. That's correct.

Mr. HECHLER. I don't see how this committee or this Congress can buy a pig in the poke like this and quickly rush to judgment on an issue where we haven't even seen the legislation.

Mr. Chairman. I'd like to ask the staff to distribute copies of the changes which ERDA has suggested in the loan guarantee language, section 103, so that all members can see the magnitude of the changes that are being suggested in section 103 that the Senate has proposed.

I would simply raise a question: How are we, who are charged with the central responsibility for speeding the ERDA authorization and the ensuing appropriations, going to be able to handle this tiger that we have by the tail now, which last week was big enough with section 103, but now has been added on to with 50 changes to 103 that you are now suggesting? We have just received and you have summarized, these changes, plus legislation that you are going to send up shortly,

plus legislation that will accompany the President's \$100 billion private/public corporation?

Mr. FRI. Well, let me try——

Mr. HECHLER. Let me just zero in on the question: Isn't it more important to ERDA to get its authorization and appropriation through quickly, so that we can get independent consideration for this vast series of proposals which have suddenly sprung loose on the Congress?

Mr. FRI. Well, let me try to break that question down into parts, Mr. Hechler.

First of all, obviously we are anxious to get our authorizations and appropriations action completed. However, it should be noted that the authorization bill has not—quite apart from section 103—the authorization bill has not passed through conference.

On the Senate side our hearings for appropriations have not been completed and, in fact, Senator Byrd's subcommittee has scheduled hearings for October 6, which we hope will in fact be held on October 6. There is substantial work to be done on the appropriations side in that body, and therefore it looks to me like we are talking in any event in ERDA of not seeing completed authorization and appropriation action for some time.

So, I think there is some time to consider this without affecting the schedule of our authorization bill at all.

Mr. HECHLER. How long could you live without——

Mr. FRI. Second——

Mr. HECHLER. How long would you be willing to live without that appropriation?

Mr. FRI. Let me finish this last point.

Second, being faced with this situation, we are prepared to tolerate some delay in the entire actions, although I would hope that the entire action on the authorization, if conference could be wrapped up by some time in the middle part of November——

Mr. HECHLER. Well, by tolerating that delay I hope that doesn't mean that the President is then going to go out and make a speech and say Congress is chicken about energy.

Mr. FRI. I don't think on this subject he is going to say Congress is chicken about energy if Congress is seriously considering the proposal that he makes here, that we move ahead with this loan guarantee authority.

Mr. HECHLER. I call to the attention of the committee the tremendous changes that we're expected to adopt in conference without an opportunity for the House of Representatives as a whole to consider, debate, and amend them. This does not preclude additional changes that the administration or others could come into the conference with, and I think that's a very disorderly way to proceed on the legislation of this magnitude.

I would hope we could divorce these two issues.

And finally, Mr. Chairman, I just want to ask one more quick question: You mentioned in your testimony that the study by OMB that started in January, the draft of which was completed in July, that I have before me [indicating] was the basis for this loan guarantee program. Is that correct?

Mr. FRI. The basis for the entire synthetic fuels commercialization program.

Mr. HECHLER. Yes.

I have with me here a 7-page letter that an official of the Treasury Department wrote commenting on this draft study, a copy of which I tried to get from ERDA, and ERDA declined to give me a copy of this letter.

I just wonder is there anything in that letter that's embarrassing, that cannot be answered by ERDA, that—

Mr. FRI. Let me respond to that question. Mr. Chairman, I notice Mr. Zarb is here, and perhaps it would be appropriate for him to enter his statement at this time.

The CHAIRMAN. We'll get him up there beside you in just a second.

Mr. FRI. OK. You're perfectly welcome to do that right now.

That letter, as I recall, was a very early draft at a fairly low level, which if I'm not mistaken—if you're talking about the same letter—was the beginning of consideration of this position that is not now Treasury's position. And I'm not embarrassed for you to have a letter from a relatively low-level official in Treasury, whether or not that represents this position.

The other point I want to make is that lest the impression be left that the changes that we are recommending here are quite as massive as perhaps you have suggested, I would only submit that I've not indicated 50-odd, but some six principal modifications to section 103, many of which are technical in character, many of which are the kinds of things I think would be debated in conference.

In any event, and as I've said earlier, the additional legislation that we intend to introduce is of a normal authorization nature. We have embodied in our statutes the authority to pursue the price subsidies and grants.

What we must do is present to you a number that is required to authorize a level at which we can operate. But the basic authority and the procedure by which it is implemented is in the Non-Nuclear Energy Research and Development Act already, so we are implementing—but not to my knowledge significantly changing in any way—that basic authority.

Mr. HECHLER. Well, I think your case would be much stronger if you had sufficient confidence in it to allow us to see some of the discussion, such as this Treasury official gave.

Mr. Chairman, I'd like to ask unanimous consent that John Milton be allowed to extend his remarks into the record posthumously: "Whoever knew truth put to worse in a free and open encounter."

Thank you, Mr. Chairman.

The CHAIRMAN. I'd like to ask one question along the line Mr. Hechler asked. A man that I consider a spokesman for the conferees of the other body and responsible to the conferees said to me that they didn't particularly care when they passed this bill, even if we waited until after November and December.

I would like to have a real answer as to how important it is to get this authorization through. They do not agree to separating the loan feature. We've agreed to separating the loan feature from the rest of the bill, and they refuse to do that. They say they'll delay it up into December or that area.

Mr. FRI. Mr. Chairman, my real answer is I've talked to our controller, and the best estimate we can make at this time in terms of the other actions that are going on in the appropriations, which I say are not completed, and what not, is that we'd like to see this authorization bill wrapped up by Thanksgiving. That represents some views or variations from what an ideal situation would be, but we feel this section is very appropriate.

If it would be helpful to the committee for me to go back to the agency and prepare a more detailed answer to that question I'll be glad to do so.

The CHAIRMAN. Frank, we all have your statement and we've read it. I think it would be more helpful to the committee if you'd just sit with Bob and answer questions than read your statement.

You are recognized, Mr. Mosher.

Mr. MOSHER. Mr. Chairman, I think the Nation will have very good reason for thanks giving if we can have this approved by that time, and I hope it will be.

I understand the concerns that Mr. Hechler expresses, but my attitude is somewhat different in that I do have confidence that we in this committee and the Congress can find a way to responsibly and thoroughly consider this measure without divorcing 103 from the authorization bill, that we can handle it in a thorough understanding manner in the brief time allowed to us.

I think the magnitude and the urgency of the need demands that we attach this importance to it, and do it and not procrastinate. So, I have that confidence in our ability to do it.

Mr. Chairman, just a footnote: I think the array of administration witnesses we have before us this morning clearly and forcefully indicates the administration's feeling of urgency in this matter, and just as an accent to that I might report a personal conversation, or personal conversations, I've had as recently as last evening with James Lynn, of OMB, who gave me his personal assurance of his own and the President's personal complete support of the program that is proposed here this morning, insofar as 103 is concerned.

You know, in the press there's been some indication that Jim Lynn might be dragging his feet on this, and there certainly isn't any such foot dragging in the comments that he made yesterday and the assurance of the President's attitude in urging that we do this job as is being proposed this morning.

I like Mr. Fri's phrase on page 3 of his statement, which we've just heard, where he says: "We must begin now." I think that's the burden of his comments this morning, and I agree.

Mr. OTTINGER. Mr. Chairman?

The CHAIRMAN. Mr. Ottinger.

Mr. OTTINGER. Something that Mr. Hechler touched on that I think is critical—and I'd like to hear your opinions on—is the relationship of this proposed program to the coming proposal of a \$100 billion corporation, which seems to be directed at the same objective of developing synthetic fuels.

How do you envisage these two programs relating? Mr. Wydler, some others and I were concerned about the \$6 billion program. We'd look at the \$100 billion corporation with some degree of terror.

At any rate, the two obviously have to relate.

Mr. ZARB. Would you like me to answer that?

Mr. FRI. Yes.

Mr. ZARB. Mr. Ottinger, you raised I think two questions: One is how do you relate, and then the other was more conceptual with respect to total size.

With respect to the first, they are completely interlinked, and it would be our vision to get by this part of it as quickly as possible and get going. As you and I know, we have a tendency to have lengthy processes in getting legislation completed, particularly if it has the slightest controversy attached to it. So that we would propose to get going now on this part of the program. And then, as we go through our testimony on EIA we can then make the necessary changes, the transition from what has been accomplished here, to the main thrust.

Mr. OTTINGER. Well, how do the two interrelate? We're going to have loan guarantees under this program to people who produce synthetic fuels, and I guess some kind of price support mechanism, and how does this corporation, as it's proposed, how is that going to relate to what we might have done under this program if we were to pass it?

Mr. ZARB. Well, it's clear that much of what was begun within this authority would be transferred over to the new entity, and the new entity would be able to pick up much of the initiative they had begun.

Mr. OTTINGER. They would have the same function. This program would also be into the issuing of guaranteed loans.

Mr. ZARB. But at that point there would be no duplication. It would be the sole entity affecting the commercial sector with those kinds of authorities; yes.

Whatever we began here can be and should be transferred over to the new entity.

Mr. OTTINGER. I'll have more to say about that on my time. I won't take the present time. I just want to understand what the relationship is.

Thank you.

The CHAIRMAN. Mr. Bell?

Mr. BELL. No questions, Mr. Chairman.

The CHAIRMAN. Mr. McCormack?

Mr. McCORMACK. Mr. Chairman, I have a number of questions. I was wondering was Mr. Zarb going to make a presentation or should we go ahead and ask questions now?

The CHAIRMAN. We read his statement. I don't see that there's much difference. I think we could save time and make the most use of the little time we've got and I think we'll gain more from the questions than by having him read what we've already read.

Mr. McCORMACK. Then I'd like to direct my questions to either Mr. Fri or Mr. Zarb.

We seem to have a series of goals in this program, as enunciated in Mr. Fri's statement, of 350,000 barrels per day of synthetics by some time—I'm not exactly sure when—and 1 million by 1985, 5 million by 1995, and 10 million by the year 2000.

Now, does the administration have, or has the administration prepared any specific schedule for these programs, and is this schedule accompanied by some description of the number of units, the amount

of materials, the amount of coal or synthetic fuels, the number of dollars divided by materials, the manpower and the sort of things that would be involved? Have these things been scoped and are they prepared for us?

Mr. FRI. Let me answer this specific question first, and then touch on more general issues, Mr. McCormack. We have prepared a nominal schedule for what kind of plants would be built, under either a 350,000-barrel or a 1 million-barrel-per-day program.

For the 350,000-barrel-per-day program, I indicated the numbers in my testimony.

Mr. McCORMACK. These are the numbers in your presentation?

Mr. FRI. That's right.

Mr. McCORMACK. That's for the 350,000 barrels per day?

Mr. FRI. Right.

The million-barrel-per-day program, we anticipate something on the order of 6 shale oil plants, 2 syncrude plants, 7 high-Btu gas plants, 10 low-Btu gas plants for utility fuel use, and 8 biomass plants.

Now, obviously, that's a projection. That depends on the kinds of proposals one receives, and so forth.

The general question is this: Our projections done in ERDA, as well as projections done by the Synfuels Task Force led by OMB, which used a different set of analytic techniques, came out with the same answer, but there's a good chance that this country may need as many as 10 million barrels per day of synthetic fuels capacity by the year 2000.

If one begins at a million-barrels-per-day production in 1985, then we are talking about a 16-percent a year growth rate to get to what this country may need by the year 2000, 16 percent a year, each and every year, for a highly capital-intensive industry. That is a pretty substantial growth rate over a 15-year period.

I'm not sure that any capital-intensive industry has sustained that rate for that period of time before. So, if we feel that we must move at that rate after 1985, it seems to me absolutely essential that by 1985 we have gotten over the problems of how you go about building one of these plants, how you solve the environmental problems, how you solve the social and economic problems, and so forth.

That is the purpose of getting going, to get those kinds of problems resolved so that we have an industrial and economic policy, a resource base, by 1985, that allows us the option of going to high levels of synthetic fuel production later on in this century.

Now, we propose to begin at a level of around 350,000. As a matter of fact, as I indicated in my testimony last—whenever it was, Thursday—prudence on the grounds that we think we can begin those plants as a first step, get them started in the first couple of years of the program, find out what kinds of problems we have, and then move to a higher level, say a million barrels, by around 1985.

On the basis of that information if we went to a million barrels right off, if we contracted for all of the plants I've just listed, I think we'd be taking an unnecessary risk in terms of environmental consequences, and so forth.

But at the 350,000 level, there we think we could prudently, without creating permanent environmental and ecological damage, if anything goes wrong—and that's basically how the program is laid out.

Mr. McCORMACK. Do you intend having full-sized economically feasible plants in operation under the 350,000-barrel-a-day target, or are you only talking about pilot plants one-third size demonstration?

Mr. FRI. Commercialized, full-scale-sized plants.

Mr. McCORMACK. And so you intend to have those in operation then by 1980?

Mr. FRI. The first ones would presumably start coming on line in the early 1980's.

Mr. McCORMACK. OK.

Is the administration prepared to prepare individual environmental impact statements, for each section of this particular program? I raise this question very specifically because of the holdup on the breeder program that was caused by generic and environmental impact statement requirements from the courts, even though commercialization had been contemplated for 15 years, and the fact that a recent court decision for the Federal Power Commission forbids them to renegotiate the contracts until they prepare environmental impact statements, including social and economic impacts in all the areas where they have facilities serving, even though they are existing today. And so I'm curious to know if you're interested in undertaking this particular facet and can you do it in time?

Mr. FRI. We have already prepared a draft programmatic or generic, if you prefer, environmental impact statement for this program, which we will shortly reduce. So, we've taken that step.

We have also begun to lay plans for the environmental program that backs up this entire endeavor. One of the purposes of the environmental impact statement process here will be to identify and gain agreement on any of the kinds of issues that ought to be resolved, and then we need to make sure that that environmental protection program which we've already begun to plan will squarely address those issues so that, as we move toward 1985, we get the information required to resolve those issues satisfactorily.

But we've already begun. Once we can go out with proposals on this program, we can begin preparing drafts, cite specific environmental impact statements.

Mr. McCORMACK. One other point related to that then is the question of safety, scaling these programs up immediately as you say, to full-scale commercial size. We'll be breaking new ground, specifically with respect to work at very high pressure, very high temperature hydrocarbons, and I'm curious to know if you're going to have any sort of generic safety studies comparable to the Rassmussen study for nuclear energy prepared?

Mr. FRI. Well, to the extent that's an issue it's clearly part of the program and needs to be handled. I don't know—Dr. Gouse, do you want to answer something on that there?

Dr. Gouse. I might add that the initial plants would be based on technology that's currently operating at the commercial scale, so no unusual safety problems would be anticipated in first generation.

There is an ongoing program to address those problems in the second generation technology, and we would do whatever was necessary to be done.

Mr. McCORMACK. Mr. Chairman, I just want to say that Mr. Ottinger pointed out Mr. Lynn's statement pointed out these will be pilot

plants in the first section of this program, that is, Mr. Lynn's response to Chairman Teague's question on that point—well, I don't think we want to pursue it in depth today, but I think it should be resolved.

Mr. FRI. All I would say is between the time we began drafting material for this and the time the President made a bunch of decisions; what we're talking about today is the synthetic fuels commercialization program. We're talking about building full-scale commercial plants, 50,000 barrels a day of shale oil, that kind of thing, which is a commercial-sized plant.

Mr. McCORMACK. Thank you.

Mr. Chairman, I just want to comment that I don't want my questions to appear to be hostile. I think this is going to require a great deal of work in every conceivable aspect of the program, but I do think that for the first time in this country we've gotten a hold of really doing something constructive in the non-nuclear area about energy.

And I think there's a tremendous amount to be done, and also there is a serious question and debates about how we should do it. But thinking this big and thinking this aggressively is the kind of thing we can do. I think Congressman Hechler's comment about the President referring to the Congress as being "chicken" is well taken. I think the President's comments in this area were extremely ill-advised in the past. But if we don't respond to this, then I think that criticism would be valid.

The CHAIRMAN. The Chair would like to ask unanimous consent to put Mr. Zarb's statement in the record, and place in the record Mr. Lynn's responses to a series of questions, and to ask Mr. Zarb and Mr. Fri to come back before the committee after these proposals come up here.

[The prepared statement of Frank Zarb and Mr. Lynn's responses follow:]

STATEMENT BY FRANK G. ZARB ADMINISTRATOR, FEDERAL ENERGY ADMINISTRATION,
SEPTEMBER 25, 1975

Mr. Chairman and members of the Committee, I am pleased to appear before you today to present the Administration's position on Synthetic Fuels Commercialization and more particularly Section 103 of the ERDA Authorization Bill, which pertains to loan guaranties. With me today is Robert Fri, ERDA's Deputy Administrator.

It is important in understanding the Administration's position on the loan guaranty provision to describe the relationship of our proposed synthetic fuels commercialization program to the overall energy development initiative announced by the President this past Monday in San Francisco.

As you know, the President has proposed a new \$100 billion Government Corporation to work with private enterprise and labor to gain energy independence for the U.S. by 1985. The President proposed that the Energy Independence Authority have the power to provide financial assistance to accelerate the introduction of emergency energy technologies into the U.S. energy supply system. One of the most important elements of the President's proposed energy independence initiative is a program to lead to the production by 1985 of 1 million barrels per day equivalent of synthetic fuels from coal, oil, shale and other domestic energy resources.

In proposing this new Energy Independence Authority, it was not the President's intention to halt or delay any important projects falling within its proposed scope. This is particularly true for synthetic fuels. Let me assure you, Mr. Chairman, that it's the President's expressed belief that the synthetic fuels program is an urgent National priority and that he desires to move forward now on the initiation of a synthetic fuels commercialization program in ERDA. Once

the Energy Independence Authority is established, the synthetic fuels program can then be transferred to it in an orderly manner.

As most of you know, the Energy Research and Development Administration has most of the statutory authorities needed to initiate the synthetic fuels part of the President's proposed energy independence program. An essential financial incentive authority which is not vested in ERDA, at the present time, is the authority to provide loan guaranties. Thus, the Administration strongly supports the \$6 billion loan guaranty authority provided in the proposed Section 103. Bob Fri will shortly discuss the Administration's detailed views on the specifics of Section 103 as well as presenting the Committee an overview of how ERDA proposes to proceed in implementing this program.

Mr. Chairman, there has been an extensive effort over the past six months to develop and evaluate alternatives for a comprehensive and responsible program to encourage the private sector to initiate synthetic fuels production in the U.S. This effort has included a detailed examination of technical, economic, regulatory and environmental factors, the costs and benefits of each, alternative financial incentives which might be offered to encourage industry investment, as well as means for program implementation. Your Committee has the draft Interagency Task Force Report which describes these analyses and I can assure you that the Administration is willing to provide the Committee with whatever additional information we can in support of your important deliberations.

In moving forward in considering this program, I believe it is important that we actively solicit the input of the States. Pursuant to a request made by a group of interested and affected Governors, I have invited them to comment on The Synthetic Fuels Task Force Report, and have assured them that, if received by the end of October, their views will be considered in formulating the final synthetic fuels program. In this connection, Governor Thomas P. Salmon of Vermont, Chairman of the National Governor's Conference Committee on Natural Resources has asked Governor Richard D. Lamm of Colorado to serve as Chairman of a National Governor's Conference Subcommittee on Synthetic Fuels to work with the Federal Government in this matter.

Finally, let me again emphasize that the President believes synthetic fuels commercial demonstration is an essential element of America's program for energy independence by 1985. He believes further that we need to move swiftly in ERDA to implement this historic program. I call upon you, Mr. Chairman, and all the members of the Committee and the Congress to act favorably on this unique opportunity and to move forward—all of us working together—to provide the necessary additional authority to initiate this important program this fiscal year.

Thank you, Mr. Chairman. We will be pleased to answer any questions either you or the members of the Committee may have.

RESPONSES TO CHAIRMAN TEAGUE'S QUESTIONS OF SEPTEMBER 12, 1975 TO
DIRECTOR LYNN OF THE OFFICE OF MANAGEMENT AND BUDGET CONCERNING
LOAN GUARANTIES

Question 1. What, if any, analyses have been made of the capability of energy suppliers and/or users to construct demonstration facilities leading to the commercialization of synthetic fuels?

Answer. In the context of a recent Interagency Study on Synthetic Fuels which has been completed and is now undergoing final review, there have been extensive analyses of both the technical and financial capability of energy suppliers and/or users to construct commercial demonstration facilities for producing synthetic fuels. In the course of the task force study effort, most of the major synthetic fuels projects currently in some stage of planning were examined to determine their technical readiness and as well as their financing status.

It was concluded from these analyses, that from a technical standpoint, there are at a minimum three each of oil shale and high Btu gasification projects that are ready for commercial demonstration, as well as several other projects including low Btu gas and methanol. The financial picture, however, is much different.

In the case of high Btu coal gasification, all major projects are being proposed by regulated gas transmission or distribution companies whose financial assets are, in almost all cases, less than the estimated capital cost of the project. Because of the economic, regulatory and environmental uncertainties associated

with bringing into operation first-of-a-kind synthetic plants, these utilities at present are unable to obtain needed financing for these projects.

In the case of oil shale, obtaining financing is not the problem. Although many of the companies interested in undertaking oil shale commercial demonstration projects are financially capable, these projects represent higher than normal risk and thus are less attractive investments than alternative investments, including nonenergy investments. In addition to the uncertainties previously noted for coal gasification projects, oil shale investors are faced with the possibility of their product being seriously undercut in price if world oil prices fall and imports of oil into the United States are permitted to increase. Thus, the added financial uncertainty of the competition is also a factor.

Thus, in summary, the technical capabilities to construct synthetic fuels plants now exist in industry but the financial limitation coupled with Federal, State, local regulatory uncertainties are delaying commercialization efforts.

Question 2. What, if any, effects will such loan guaranties have on the capital markets and other domestic energy alternatives which may be more economic?

Answer. Any type of Federal financial assistance, including loan guaranties, resulting in the undertaking of energy projects which would not have otherwise been undertaken will lead to some distortions in our capital markets. Such programs increase the demand for capital, while having little or no effect on the overall supply of capital.

However, the magnitudes of the adverse impacts will, of course, depend on the amount of money involved and the length of time over which the money is raised in the capital markets. The \$6.0 billion in loan guaranties proposed in Section 103 of the Senate version of the ERDA Authorization Bill could directly result in up to a \$9 billion investment over the next 10 years in synthetic fuel plants. Relative to the Nation's \$200 billion (1974) annual investment rate or even compared to the mortgage, commercial, and industrial annual loan rate of about \$80 billion (1974), the effect of a \$6 billion loan guaranty program for synthetic fuels is small (an average of about \$1 billion/yr. of investment) in relation to total capital investment and therefore not likely to have a major impact on the general cost of availability of capital.

It is true that a loan guaranty program would divert some capital from other areas although not necessarily just other energy projects. Some diversion, however, would be intended since the objective of the loan guaranty program would be to attract additional capital into the energy sector in order to undertake the commercialization of domestic synthetic fuels. This is especially important now since capital investment in energy has decreased during the last year.

As domestic oil and gas are depleted and become more expensive to extract synthetic fuels will become directly competitive. The commercialization program and its associated incentives will have been completed by the time synthetic fuels are to compete favorably with domestic energy alternatives.

Question 3. Do you intend that loan guaranties be used solely for construction of "one-of-a-kind technology" commercial plants, but not for support facilities that may be required, such as schools, roads, and other public facilities?

Answer. At present we intend that loan guaranties be provided for commercial demonstration plants that generally represent a unique technological approach or process in converting coal, oil shale and other domestic energy resources to synthetic fuels. By this definition, several oil shale plants or several gasification plants using different retorting processes and coal feedstocks could be constructed within the scope of the loan guaranties program. However, we do not believe that the program at this time should be used to finance large numbers of identical plants. We intend that the loan guaranty program initiate synthetic fuels production and not sustain an industry. It is our belief that after a number of synthetic fuels plants of different types are built and operated that the economic environmental and regulatory risks will be substantially reduced. This, in combination with greater certainty about future levels and prices of foreign oil imports should create an investment climate conducive to carrying on the industry without the need for government support.

With regard to the financing of schools, roads, and other public facilities, we do not intend that the loan guaranties proposed in the ERDA program authorization bill be used for this purpose. We anticipate that there would be some need for Federal assistance to regions and locations impacted by a synthetic fuels program, particularly in remote areas, but we believe there is sufficient authority currently in various areas for this purpose. We believe it is important to handle impact assistance separately in order not to confuse the purpose of this particular loan guaranty program.

Question 4. How many facilities and of what size do you anticipate could be built with a \$6 billion program?

Answer. The number of synthetic fuels facilities that could be financed with a \$6 billion loan guaranty authority would depend on the size and type of plants selected, the percentage of the total construction costs that is guaranteed by the Government and the extent of other incentives offered in conjunction with loan guaranties.

The analyses undertaken by the Interagency Synthetic Fuels Task Force suggested that loan guaranty would be appropriate both for high Btu gasification plants as well as for oil shale plants. Although in the case of oil shale, price supports would probably be needed in addition to loan guaranties. If it is assumed that guaranties up to 75% of the project cost are offered for high Btu gas projects and up to 50% of the project cost for oil shale and other unregulated fuels than those estimated that \$6 billion of loan guaranty authority would be adequate, in conjunction with other incentives such as price supports, to initiate a 350 thousand barrel per day (10-13 synthetic fuel plants) first phase of possibly a larger program. This estimate includes inflation and a contingency for unforeseen developments.

With respect to plant size, it is expected that commercial size high Btu gasification plants would be on the order of 250 million cu. ft. per day (approximately 40,000 barrels per day of oil equivalent) and oil shale plants would be between 30 and 50 thousand barrels per day. Low and medium Btu gasification plants which would serve industrial and electric utility users would probably be on the order of half that size.

Question 5. In view of the technical, regulatory, environmental, and other problems associated with oil shale and high Btu gasification development, do you anticipate that you would receive and approve any application for a loan guaranty in fiscal year 1976?

Answer. As you know, the ERDA authorization for 1976 would extend through the transition quarter until October 1, 1976. The schedule for initiating a synthetic fuels program envisioned by the Interagency Task Force holds, would provide for a Final Programmatic Synthetic Fuel Environmental Impact Statement and for final program guidelines by early 1976. At that time, request for industry proposals could also be issued. Site specific environmental impact statements could be in preparation by the early spring and final project selections could be made by mid-summer 1976. Thus, we would anticipate that commitments to guaranty could be made as early as the middle to late summer of 1976.

In any event, without an authorization for this program in this Congressional session, it is doubtful the loan guaranty program would be interpreted by the private sector as a credible initiative. Therefore, delays in authorization will simply result in delays in getting the program off the ground.

Question 6. Should the guaranties be limited to lender of last resort situations? Should the guaranties be limited to U.S. citizens or Nationals and corporations substantially controlled by U.S. citizens and nationals?

Answer. We do not believe that a requirement that loan guaranties be limited to the lender of last resort is appropriate for synthetic fuels at this time. Unlike housing, ship building, and a number of other areas where there are eager participants but no lenders, some synthetic fuels ventures are not proceeding because of risks to the project proposers. Such risks include uncertainties concerning future competitive price of foreign oil imports, regulatory uncertainties and environmental clearances. In order to encourage industry to undertake a few selected synthetic fuels projects it will be necessary to provide a positive inducement. An excellent example of this situation is in oil shale where prospective industries do not have any problem raising equity or borrowing against their assets if they are convinced that the project would be profitable. In this case, it is not a question of not being able to find a lender, it is a question of the relative attractiveness of alternate investments including non-energy investments as compared with higher risks synthetic fuels investments. Thus, we believe it would be counter productive to the purposes of the loan guaranties program for synthetic fuels to limit participation only on the basis of not being able to secure a loan in the private capital markets.

With respect to the question of foreign control of companies seeking guaranties under the proposed program, we would not limit participation strictly to United States controlled companies. If a foreign company has synthetic fuels technology which is appropriate and desirable for demonstration on the commercial scale in the U.S., we believe that company should be eligible for the loan guaranty pro-

vided that the plant is built in the U.S., uses domestic resources and sells the product primarily for U.S. consumption.

We would suggest rather than providing specific limitations relating to foreign ownership in legislation that these matters be handled through the administrative regulations which would be promulgated by the Administration of ERDA pursuant to Section 103 in the event it is adopted.

Question 7. Should the loan guarantees be subject to the patent provisions (sec. 9) of the Federal Nonnuclear Energy Research and Development Act of 1974? Should the public information provisions (Sec. 107(e)) of the Energy Reorganization Act of 1974 apply?

Answer. Our understanding of Section 103 is that it would be carried out pursuant to the Nonnuclear R&D Act of 1974 as appropriate. It should be noted that a synthetic fuels program would involve, for the most part, the application of existing synthetic fuel technologies on a commercial scale. Most of the technology likely to be used has already been developed and currently exists. Many of the patents already exist. Extending loan guarantees would not necessarily constitute grounds for the U.S. taking title.

With respect to the public information provisions (Section 107(e)) of the Energy Reorganization Act of 1974, it is our position that they should apply as well as other applicable laws.

Question 8. Should the loan guaranty authority be available for demonstrations of any new energy technology, including those utilizing (renewable) energy resources and those related to energy conservation?

Answer. We do not believe that a loan guaranty authorization should be available at the present time for any new energy technology including conservation and renewable energy resources, although we would agree that ERDA should have the organic authority for possible use at some future time. It is our view that the only emerging technology areas where a loan guaranty could be appropriate in the near future outside of the synthetic fuels program would be in geothermal and solar heating and cooling. In both of these areas a Federal program already exists. In geothermal, we already have a Congressionally authorized loan guaranty program and in solar heating and cooling the Congress and the Executive Branch have agreed to a phased cost shared demonstration program. In the case of conservation, we are not aware of any analysis which suggests that either loan guaranties are needed or that are the preferred incentive for stimulating the industry to adopt existing new technology. These reasons coupled with our estimate that the full \$6 billion which would be authorized will be needed for synthetic fuels lead us to the conclusion that authorizations for loan guaranties beyond synthetic fuels are not appropriate or desirable at this time.

Question 9. Would the provision concerning recourse in case of default in section 103(e)(3) of the Senate Amendment be included in the authority for loan guaranties?

Answer. Undertaking the commercialization of a new synthetic fuels, industry will entail major risks for the investor due to regulatory, economic, and environmental factors. The proposed loan guaranty incentive for commercial demonstration in Section 103 removes some of the burden of such risks from potential lenders and thereby reducing their exposure to risk. But the recourse provisions of Section 103(e)(3) need to be revised to provide flexibility to offer an incentive by sharing the risk with the entity established for the project as well as any parent or controlling corporate interest. Limiting the government's recourse to the assets of the synthetic fuel project excluding recourse to the assets of any parent entity would provide such an incentive while still ensuring ample assets at risk by the participants due to the limitation of 75 percent on the guaranty. The flexibility to limit recourse to the project assets will be necessary to attract project participants in two instances:

Companies with large assets and revenue flows have a wide range of low-risk investment opportunities both within and outside the energy sector. Although a recourse loan guaranty may reduce slightly project cost and provide capital to the point where the project participants are willing to provide 25% to 50% of the project cost, the guaranty would still obligate them to pay default costs out of parent company assets. Without flexibility to grant non-recourse loan guaranties to parent company assets but with recourse to project assets, the high-risk nature of these projects might well discourage competent and otherwise willing firms from participation. Such firms might be found in the oil, steel, and chemical industries.

Regulated gas utilities, the largest of which currently has net assets of only \$565 million, appear willing to become project participants and provide some of the equity. But the assets of these utilities will not be adequate to cover the costs of default in the circumstances where the Federal Government has full recourse. Consequently, it is not only the utility investors that would bear the cost of default but also the utility customer. Public utility commissions are currently unwilling to place such a risk and open-ended burden on their rate payers. The flexibility to limit Federal recourse, in case of default to project assets and not the assets of any parent or controlling interest, would reduce the burden of the risk for these first-of-a-kind plants and permit broad utility participation.

The CHAIRMAN. We only have 15 minutes more, and I'm not going to call each individual member, but I'd like to request them——

Mr. BLOUIN. Mr. Chairman, maybe an inquiry first: Do we intend to have an additional hearing on this subject?

The CHAIRMAN. Yes, as soon as we get the President's proposal I expect to hold hearings every moment there is.

Mr. BLOUIN. Are we going to withhold any decision as a committee in regard to our conferees' position on this section until such time as this committee has all the information of this sort?

The CHAIRMAN. Yes, sir.

Mr. BLOUIN. I have one question then for Mr. Fri or Mr. Zarb.

I notice you refer to price supports. That's a very interesting phrase. Being from a rural area, I was very concerned about another price support bill this year that the President took a philosophical position against and vetoed, in regard to food for people.

I'm just wondering what brought about the change of heart for this industry that is obviously not economically depressed.

Mr. FRI. Well, what we're talking about here is a situation where the economics of these plants depend very heavily on the world price of oil in the future, which is an uncertain thing, and on the cost of the synthetic fuels produced, which is also somewhat uncertain.

There is, therefore, a reasonable chance that the price at which this gas can be sold in 1985 let's say would be less than the world cost, and if we are to have these plants built we need a price subsidy to fill that gap.

Mr. BLOUIN. Well, where are we planning to sell the synthetic fuels, within the United States?

Mr. FRI. Yes.

Mr. BLOUIN. Then why on earth does it have to be priced at the world level? What's that got to do with the selling price within the United States?

Mr. FRI. I think—go ahead.

Mr. ZARB. I believe what Mr. Fri has been saying is that the price level that these synthetics will come on line at is going to be somewhat higher than we currently perceive current market prices to be. Unless there's a notion of making these enterprises economically feasible there will be no production. And there's no relationship between this and the other price supports which you just referred to.

The economies are different, the circumstances are different, the characteristics are different.

Mr. BLOUIN. Well——

Mr. ZARB. I'd like to finish, Congressman. We have 40 percent less oil energy than the demand right now, and at the rate we're going

it's going to be 50 percent by 1980. This is an attempt to bring some of the price control back under our domestic wing, rather than leaving it up to the decisions of people in Vienna.

To do that we're going to have to have some notion of price or else the job just simply isn't going to get done.

Mr. BLOUIN. Well, by way of a comment, as opposed to a question: I might just state that I see all the relationship in the world between price supports for another industry in terms of the logic of the need, if, in fact, the logic holds for here, too.

Frankly, I've always had a very difficult time following the logic of most of the administration's position on the development of resources and the incentive or lack of incentive that you propose to have within that industry. But I just don't see the need for establishing a bottom price or some type of a support price on synthetic fuels. I've got a difficult enough time accepting the loan guarantees.

Mr. GOLDWATER. Mr. Chairman?

The CHAIRMAN. Mr. Goldwater.

Mr. GOLDWATER. Mr. Zarb, Mr. Fri, in section 103 of the Senate bill there is a provision there for solar and geothermal, and my understanding is it is the administration's position to take that out. Could you just elaborate your reasons why?

Mr. FRI. Yes, that's our position, Mr. Goldwater.

Mr. GOLDWATER. All right.

You don't need to elaborate that now, but I would like some rationale in writing we could look at.

Mr. FRI. We'll be delighted to provide it.

The basic rationale is that the other areas that we're talking about are primarily solar electric, solar heating and cooling, and geothermal, and in geothermal we already have a loan guarantee program. In solar electric we're really not at the stage where we can build commercial-scale plants. In solar heating and cooling the Congress has passed a demonstration type of program to stimulate the market.

And while we may decide that that's the wrong kind of a program, I would submit that that requires a lot of consideration, to change the course that we are already on. And such a program in heating and cooling is quite different, because of the various number of small companies and the large number of homeowners that would be involved.

Mr. GOLDWATER. Mr. Fri, we're running short of time, and I know other members would like to ask some questions. But if you could elaborate on that it would be very helpful.

Mr. FRI. We will do that.

[The following communication relates to a reversal in the administration's position on this issue:]

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION,
Washington, D.C., October 6, 1975.

Hon. OLIN E. TEAGUE,
Chairman, Science and Technology Committee,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: It is my pleasure to inform you that the Administration has withdrawn its objection to that provision in section 103 of the Senate-passed bill, S. 598, relating to the establishment of loan guarantee authority for the so-called renewable energy sources.

The Administration now supports the establishment within the Energy Research and Development Administration of authority to guarantee loans for "... facilities to generate power or heat in commercial quantities utilizing as their energy source direct solar, wind, ocean thermal gradient, bioconversion, or geothermal resources. . ."

We have, as you are aware, presented the Administration's views to the House Science and Technology Committee on changes in the Senate language we would prefer which would facilitate the administration of the loan guarantee programs. We are prepared to testify further on this subject should you so desire.

Sincerely,

ROBERT C. SEAMANS, Jr.,
Administrator.

cc: Hon. Charles A. Mosher, House of Representatives.

Mr. GOLDWATER. These two others you could present very well in writing:

One, in regard to the economic impact of such a loan program and the potential distortion of the market, I'd like to have some rationale or some benefit of any studies that have been conducted on such a loan guarantee program.

The last question that I would like you to address yourself to—and I assume this would be addressed to Frank Zarb—has to do with how you arrive at this particular decision to support this loan guarantee. In other words, the question might read: From what set of facts do you arrive at the decision that the traditional means of capital accumulation and banking activity will not really meet the demands of this kind of endeavor.

[The responses to the above questions follow:]

Question 1. What, if any, analyses have been made of the capability of energy suppliers and/or users to construct demonstration facilities leading to the commercialization of synthetic fuels?

Answer. In the context of a recent Interagency Study on Synthetic Fuels which has been completed and is now undergoing final review, there have been extensive analyses of both the technical and financial capability of energy suppliers and/or users to construct commercial demonstration facilities for producing synthetic fuels. In the course of the task force study effort, most of the major synthetic fuels projects currently in some stage of planning were examined to determine their technical readiness and as well as their financing status.

It was concluded from these analyses, that from a technical standpoint, there are at a minimum three each of oil shale and high Btu gasification projects that are ready for commercial demonstration, as well as several other projects including low Btu gas and methanol. The financial picture, however, is much different.

In the case of high Btu coal gasification, all major projects are being proposed by regulated gas transmission or distribution companies whose financial assets are, in almost all cases, less than the estimated capital cost of the project. Because of the economic, regulatory and environmental uncertainties associated with bringing into operation first-of-a-kind synthetic plants, these utilities at present are unable to obtain needed financing for these projects.

In the case of oil shale, obtaining financing is not always the problem. Although many of the companies interested in undertaking oil shale commercial demonstration projects are financially capable, these projects represent higher than normal risk and thus are less attractive investments than alternative investments, including nonenergy investments. In addition to the uncertainties previously noted for coal gasification projects, oil shale investors are faced with the possibility of their product being seriously undercut in price if world oil prices fall and imports of oil into the United States are permitted to increase. Thus, the added financial uncertainty of the competition is also a factor.

Thus, in summary, the technical capabilities to construct synthetic fuels plants now exist in industry but the financial limitation coupled with Federal, state, local regulatory uncertainties are delaying commercialization efforts.

Question 2. What, if any, effects will such loan guarantees have on the capital markets and other domestic energy alternatives which may be more economic?

Answer. Any type of Federal financial assistance, including loan guarantees, resulting in the undertaking of energy projects which would not have otherwise been undertaken will lead to some distortions in our capital markets. Such programs increase the demand for capital, while having little or no effect on the overall supply of capital.

However, the magnitudes of the adverse impacts will, of course, depend on the amount of money involved and the length of time over which the money is raised in the capital markets. The \$6.0 billion in loan guarantees proposed in Section 103 of the Senate version of the ERDA Authorization Bill could directly result in up to a \$9 billion investment over the next 10 years in synthetic fuel plants. Relative to the Nation's \$200 billion (1974) annual investment rate or even compared to the mortgage, commercial, and industrial annual loan rate of about \$80 billion (1974), the effect of a \$6 billion loan guaranty program for synthetic fuels is small (an average of about \$1 billion/yr. of investment) in relation to total capital investment and therefore not likely to have a major impact on the general cost or availability of capital. Even when compared to the average total annual capital investment in energy in the U.S. which is about \$35 billion/yr., the capital investment arising from this program is not large.

It should be kept in mind, nevertheless, that about 50% of the \$200 billion net flow of funds in U.S. credit markets is now being taken to finance existing Federal, State, and local programs. It is also clear that heavy governmental borrowing pressures will continue for a number of years to come and it is crucial that we minimize these pressures. It is our judgment, however, that synthetic fuels commercialization is an important enough effort for our national well-being that it is well worth the impact.

It is true that a loan guaranty program would divert some capital from other areas although not necessarily just other energy projects. Some diversion, however, would be intended since the objective of the loan guaranty program would be to attract additional capital into the energy sector in order to undertake the commercialization of domestic synthetic fuels. As domestic oil and gas are depleted and become more expensive to extract synthetic fuels will become directly competitive. The commercialization program and its associated incentives will have been completed by the time synthetic fuels are to compete favorably with domestic energy alternatives.

The CHAIRMAN. Mr. Thornton, you have time for one question.

Mr. THORNTON. Thank you, Mr. Chairman.

I would first like to state that I wish to express my appreciation that the administration has now come forward with an affirmative program which expands upon the proposal which I made last February, to create a national power resources authority, funded for the purpose of providing financing and construction for needed energy facilities. I think it is time that they have come to move forward with affirmative programs, rather than simply negative allocation-rationing type approaches to the energy problem.

I do think that it's important to note one specific question, however at this time, and that is: The statement has been made that ERDA presently has authority to enter into agreements for price supports or guaranteed prices without further legislation, and I do not believe that is correct.

The authority to ERDA to enter into price-support agreements is subject specifically to the provision of subparagraph 6, of section 7, forms of Federal assistance. And subparagraph 6 of that section says: "no price support program shall be implemented unless previously authorized by specific legislation enacted by the Congress."

For that reason I think it is very important that we address—Mr. Fri, as you and I did the other day—the need for having some price supports for sources of fuel which are necessary to our national security, but which may be uneconomic or threatened by a reduction in price by foreign suppliers.

I would like to have your comments, Mr. Fri, or Mr. Zarb, on whether it would be possible for the administration to come forward with comments concerning the National Power Resources Authority, which was introduced last February.

Mr. FRI. Sure, yes.

Mr. OTTINGER. Mr. Chairman?

The CHAIRMAN. I don't know if we have time for you to make a closing statement, Frank.

I would like to say to the members here that you're going to get a chance before this is over with to ask all the questions you want to, but this morning we've got to quit and let Mr. Symington's subcommittee have this room.

Frank, if you want to make a closing statement?

Mr. ZARB. Mr. Chairman, we would be most happy to come back and answer all of these questions orally, and more if we can do it. I think it's an awfully important thing that we continue this discussion and debate in a very substantive role.

If I were to add anything to close, I would just like to add an edge of urgency to all of these deliberations. We've been talking about a problem now for a number of months.

During that course the problem has worsened. We are going to see some of the fruits of that this week and through next year as the American consumers have to pick up a bigger price for energy.

I am concerned, Mr. Chairman, with a tendency to ignore the traditional "can-do" American attitude. We need to have a good fair debate of these propositions and clarify the facts and come to decisions. But a negative approach to zeroing in on why we shouldn't and what are the reasons not to or not face up to some of the real problems and honestly face them for what they are seems to me not to be in keeping with our national tradition.

We tend sometimes to seem to feel that we no longer have to face up to rough decisions as a Nation and that all of our problems will be taken care of for us free of charge. Maybe that's what we've gotten to as a Nation, but we had better not in this case, because our problems—short term and long term—are continuing to grow, and at some point they're going to blow up in a very meaningful way, and then we'll be crashing all around the place with all kinds of desperate actions to make up for lost time.

So, while I think we will be available to come back for as many hours as required to debate the substance, I would just like to leave a sense of urgency to get on with this job with every vehicle at our disposal.

The CHAIRMAN. Thank you, Frank.

Thank you, Bob.

The hearing will be adjourned.

[The hearing in the above entitled matter was adjourned at 9:55 a.m.]

**LOAN GUARANTEE PROVISION, H.R. 3474
ERDA AUTHORIZATION BILL, FISCAL YEAR 1976**

THURSDAY, OCTOBER 30, 1975

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, D.C.

The full committee met, pursuant to notice, at 10 a.m., in room 2318, Rayburn House Office Building, Hon. Olin E. Teague, Chairman of the committee, presiding.

Chairman TEAGUE. The Chair would state the parliamentary situation as he understands it. He welcomes any questions or comments from the members. The committee has held hearings and has passed an ERDA authorization bill. The Senate held hearings and passed an authorization bill. In it, they placed a \$6 billion loan feature we had not held hearings on or considered in any way. As a result of numerous requests, we held extensive hearings of both subcommittees on energy.

This meeting today is strictly for the information of the members of the committee and the conferees. After this meeting today the conferees will meet. I talked to Senator Jackson and we expect to meet next week to try to take positive action on this bill.

I ask today that the two subcommittee chairmen, Mr. Hechler and Mr. McCormack, give the rest of the committee and the conferees the benefit of what they learned. Are there any comments or questions? I recognize Mr. Hechler.

Mr. HECHLER. Thank you, Mr. Chairman. Each member of the full committee has before him and her, a 20-page summary of the hearings which the Fossil Fuels Subcommittee held. I am not going to read this entire 20 pages. I would like to refer to it frequently so if each of you has a copy of it in front of you, it would be helpful in terms of following the discussion.

We have tried to review, in the subcommittee, the loan guarantee provisions of section 103. Also, the leasing provisions of section 102; 102 is a little known section that has not been mentioned very much in these hearings. Yet, it is a section that has great relevance to the Occidental oil shale people with respect to the leasing provisions.

The subcommittee held very extensive hearings on both 102 and more particularly 103. We heard more than 75 witnesses, both here in Washington and on the eastern and western slopes of Colorado. There were three intensive days of work in Colorado. I might point out that the transcripts of the Colorado hearings are not yet available. It may be significant that the three members that went out to Colo-

rado are 100 percent in favor of separating out section 102 and 103 from the authorization bill. I certainly hope that all members of the committee could have an opportunity to review that testimony which we took in Colorado which I can only summarize.

We gave full and free opportunity for the proponents of the incentives to testify, including ERDA, OMB and other numerous Government departments and agencies. We heard from the coal gasification companies, oil companies, oil shale companies, investment houses, the Oil Shale Corp. (TOSCO), Union Oil Co. of California, Occidental Co., Dillon Reed & Co., Dr. Henry Linden, President of the Institute of Gas Technology, Arthur Seder, President of the American Natural Gas of Detroit, and J. E. Bixby, President of Texas Eastern Gas Transmission Corp. We heard from the major engineering contractor, M. W. Kellogg & Co. We heard from the Assistant to the President of Chevron Research Co.

We heard from the Vice Chairman of the Federal Power Commission. We heard very extensively from ERDA and OMB witnesses. Yesterday afternoon we heard again from ERDA and OMB. A number of the members of the committee had additional briefing from OMB and from ERDA.

Last Thursday we had terrific testimony from the National Governors conference, four governors of which appeared here personally and traveled here from Colorado, North Dakota, Wyoming and Vermont.

They officially represented the position not only of the Western Governors but also of the Appalachian Governors and the National Conference of Governors.

In Colorado, we toured the Paraho and Occidental operations. We sat down for lunch and informal discussions with TOSCO. The members of the committee paid for their own lunch.

We held hearings in the town of Rifle, in western Colorado. In Colorado, we heard from a former Governor and the present Governor, from the executive secretary of the Colorado Petroleum Council, the Farmers' Union, environmentalists, the League of Women Voters, the Cattlemen and Grazers, the president of Sunedco of Dallas, Tex. and executive vice president of Rio Blanco oil shale project, geologists, and land experts.

Now, in the Colorado hearings, Mr. Chairman, I think it is fair to say that very serious challenges were thrown at the marginal economics of oil shale development. Very serious challenges were thrown at the specter of taxpayers and consumers shouldering the burden and risk of producing synthetic fuels. Serious challenges were thrown at subsidizing big industry, not only with loan guarantees of \$6 billion but with price supports and construction grants of \$5 million.

I think you could build these plants with a loan guarantee but they cannot operate without price supports. In addition to that, yesterday afternoon OMB came into us with a new figure that I had never heard before. It was \$410 million for assistance to the local communities included in the \$6 billion loan guarantee.

Now, when we started the exercise about a month ago, everybody talked about the availability of 1,200 Federal programs to take care of

the economic impacts. Something new comes in every day. Now, this is symptomatic of what has been happening. This morning each of you have on your desk a four-page single-spaced letter with attachments from Dr. Seamans dated October 30, 1975.

I have not had a chance to read it because it just came to me about 5 minutes ago. I know that you, Mr. Chairman, have certainly had somewhat of a tough time here because the administration has not been very consistent. I don't want to ask you to respond to that observation but there has been a lot of zigging and zagging and new proposals do come in on different projects. There is new legislation that comes in to us at the last minute.

For example, glancing at this letter that just came in 5 minutes ago, at the top of page 2, it says: "There is also included a major new amendment, subsection 1, which would authorize the administrator to provide a significant measure of assistance to certain communities." I am in favor of this. I have been harping on this for 6 weeks. But give us a chance to find out just what is in this thing that we have been asked to buy. Give us a chance to review it. I think it is a terrible commentary on congressional procedure if we just simply abdicate as members of the Science and Technology Committee and give this to the conference committee where a few people would then take all of the new material or all new legislation and all the new ideas and rewrite completely a bill that has not gone through the legislative process in an orderly fashion.

Chairman TEAGUE. I have just received the same letter 30 seconds ago. Would you be interested in yielding 5 minutes to ERDA to discuss this?

Mr. HECHLER. I would be glad to yield 5 hours to ERDA. I want to make the point before I do this, that yielding 5 minutes to ERDA at this point to have them explain a four-page letter on which we have to make a decision or go to conference on—this, I think, is an outrageous way to proceed legislatively. It is irresponsible, if I could use the word.

Chairman TEAGUE. From the beginning of this year, this committee has pleaded and begged all the way through for information. I don't know what is in the letter. I don't know if it is technical or something completely new. I think we ought to give them a chance to say what it is.

Mr. HECHLER. On the top of page 2, if you read the line, which is one of the few lines that I read, it says:

There is a major new amendment subsection 1 which would authorize the Administrator to provide a significant measure of assistance to certain communities which would experience a major increase in population and so forth.

May I suggest that I continue with my report and then we could yield?

Mr. MOSHER. I don't know if this is proper to intervene but I asked our staff to comment on the letter. It is my understanding there is little or nothing proposed here that is not already in the proposed legislation that has been developed within the committee. In effect, this is a confirmation by the administration of the ideas developed within the committee. We could develop that later. This is only a recommendation from the administration. It is the committee and conferees that are developing the legislation.

Mr. HECHLER. We started out with a \$6 billion loan guarantee written into the Senate bill. ERDA initially indicated that this should be confined to fossil fuels synthetic development. Then ERDA came in with a proposal that this be applied to renewable resources. Then, ERDA came along and indicated they would like to add \$4.5 billion additional for the price supports and \$600 million for construction grants.

All of this legislation started to filter up gradually. We had an opportunity after some time to get our teeth into this. My point is, Mr. Chairman, that I feel during the 6 weeks of hearings that we have uncovered a lot of snakes under the rock. Every time we shine the flashlight in the corner, there are a lot of bugs running around. We want to find out what these things are. It seems to me every time we advance a foot, we are pushed back 2 feet with new information which is difficult to digest.

Mr. WYDLER. I am very sympathetic with the gentleman's position on this. I truly have no breadth of knowledge such as you on this subject. Could you give me the illustration of what you consider the major weakness in this legislation as we have it before us?

Mr. HECHLER. Yes; I would like to get into this in an orderly way.

Mr. WYDLER. You could use 100 different examples, I am sure, but I would like to have something solid that we could think about. I am not trying to put you on the spot.

Mr. HECHLER. You are not putting me on the spot. There are a number of major weaknesses and minor weaknesses that I will detail as I continue my report.

Mr. GOLDWATER. Will you yield?

Mr. HECHLER. Yes.

Mr. GOLDWATER. You commented about the legislative process. I would just like to make an observation. This is not necessarily in defense of the administration but I think we should point out it is this committee that is doing the legislating. Not the administration. We have through all this process asked for all kinds of comment. We have received it. This is true even in our earlier ERDA markup. There were last minute memorandums and changes in the legislation.

I don't think this is anything new. I don't think we have to be distraught over the fact that a last minute missile comes sailing in. This is par for the course in the area where we are plowing through new ground. I, for one, am not necessarily overly concerned that ERDA comes here with a letter, which in essence, summarizes the comments which we in essence, asked them to comment on.

Mr. WIRTH. I understand what the gentleman from California is saying. However, I am very aware of the facts. Now, in being new to the process I recognize things are going to come in. We should be accustomed to certain technical changes which, I think, the gentleman is referring to. What we have here is something much bigger than this. Now, for example in the last 2 weeks we have seen the price of the program double. We originally started with \$6 billion. Now, we are up to \$12 billion. That is more than the kind of minor changes or addendum that might come into an orderly legislative process. What is happening in this legislation is certainly different from anything that I have seen happen in the development of a major piece of legislation which has changes at the last minute.

Mr. HECHLER. May I continue?

Mr. MYERS. We are talking about \$6 billion. The impression is we are spending it at the last moment. We all know, this year earlier, we dealt with a bill we sent out which was \$18 billion. It was a tax cut. It came back with \$23 billion from the Senate. We accepted it.

Chairman TEAGUE. You may continue, Mr. Hechler.

Mr. HECHLER. Thank you. I was just advised that a representative of the Interior Department called up and indicated that the Western Governors desired to have further input into this program. We are raising the question as to whether there is any opportunity for them to indicate their position.

Chairman TEAGUE. One of the Governors contacted me and intimated his position was not being represented last Thursday. I directed a wire be sent to each Governor individually and asked for their opinion on this situation. The staff took the word "individual recommendation" out. They seem to think they know more about what I want, than I do. I wanted a comment from each Governor. We are trying to get it. All Governors do not agree.

Mr. HECHLER. It is amazing as to the unanimity of the reactions that we got from the representatives who spoke for the National Governors Conference.

Chairman TEAGUE. Well, perhaps we are getting different stories from them. One Governor says things are coming here that should not be accepted.

Mr. HECHLER. Let me try to answer some of the questions. I will answer them as best I can.

Now, President Ford indicated in his message to Congress on the 20th of October, regarding food stamps:

"We should not give one dollar of Federal assistance to those not in need."

It seems to me that the structure and framework of this program is primarily to take the risks out. That is, the capital risks out of the big energy business. This is because primarily this will be or these will be big energy companies that get loan guarantees. There is no comparable effort to try to take the risks out for the taxpayers and consumers in connection with this program. We certainly found out in our examination of witnesses in Colorado that there was no effort whatsoever to try to assess the impact on the people in the communities in Colorado.

Now, Mr. Swigert has made an excellent three page report which was made available to all members of the committee. He indicated only two witnesses of the 42 from impacted areas reported any input in the preparation of the synthetic fuel commercialization program.

I would like to quote from his report. I think it is an excellent report.

Many industry witnesses did not favor government financial incentives. Those that did appeared to favor price supports over loan guarantees. The modular approach was favored over the jump to regular large production plants. Witnesses indicated there are many unknowns in building these. It was a general recommendation of both technical and industry groups that the performance data of one retort of commercial size be determined prior to committing to the coincident construction of the 5 to 10 retorts necessary to achieve a 50,000 barrel per day plant capacity.

Another point—and this is from Mr. Swigert's report:

The availability of sufficient water for oil shale processing on a scale contemplated appears to be a subject needing additional investigation. Testimony indicated that the unused Colorado water not presently in litigation would probably

not support production levels presently planned and probably also not without the construction of storage facilities. Since this conflicts with Administration figures, more investigation is needed in this area. There is great concern by farmer and cattlemen's organizations over the purchase of sizeable agricultural water by oil shale companies and probable future diversion of this water with resulting degradation of the principal state industry. The affected communities are small, the population being 1600 and cannot, by themselves, handle annual population growth rates, in excess of 5 percent without severe economic hardship. The testimony from state officials indicated facility and service costs of new residents may be between \$3,000 to \$5,000. A single 50,000 barrel per day shale plant would have the effect of doubling population levels and result in new facility costs equal to twice the current tax base. No revenues are available for 3 to 4 years. Witnesses expressed almost universal consensus that social economic grants be distributed directly to the states, preferably to the communities themselves. They expressed at least an implied lack of confidence in the federal program.

That is very evident from the testimony that we got. The former Governor of Colorado testified that this bargain basement type of many confusing Federal programs which is submitted to you simply is not sufficiently applicable for the immediate situation.

Now, on the proposal that ERDA is making that communities be guaranteed against their bond default, I would like to point out in the late 1960's, President Johnson submitted a loan guarantee proposal to Congress aimed at helping local communities build the needed sewage treatment plants. That, like the guaranteed loan program contained in the ERDA recommendation, required the municipal bonds be guaranteed to be taxable and not tax exempt. Also, it provided that there be an interest subsidy differential. At that time, several municipal groups such as the National League of Cities and Conference of Mayors strongly opposed the program saying it was a foot in the door effort by the Treasury Department to do away with tax-exempt municipal bonds.

We have no evidence that OMB has consulted with any local communities or the League of Mayors or the National League of Municipalities about this proposal or its bonding impact. These are all issues that have been raised in the course of my report. I will elaborate, of course. I would call the members' attention page 11 of the 20-page report.

We had a particularly effective piece of testimony from the county commissioner of Rio Blanco County, W. D. Brown, which I had quoted on page 11 of the summary report. He is also a member of the Colorado West Area Council of Governors. He estimates three oil shale plants will bring in 23,000 people in five to 7 years in his region. And \$90 million in new money is needed prior to the population growth. This is four times as much as the entire State of Colorado spent in capital construction 1974 and 7 times the budget or 15 times with regard to the counties in Colorado in 1975.

This adds up, Mr. Chairman, to the fact that the testimony before our subcommittee revealed there had been insufficient thought given to the impact on communities and to the water supply in these areas which will be needed. Also, to the risks that people themselves will take. I refer to people needing housing or communities that have to float bond issues in order to build schools, roads, and other public facilities.

I feel, Mr. Chairman, speaking personally, and I don't want to speak for other members of the committee on this point but the procedure of rewriting this whole bill in conference is very faulty. This is sort of

like attaching a big platinum plated caboose to the end of the ERDA train. When you look at the caboose it is very heavy. It is well appointed. It is like a private car. It is very difficult for the rest of the taxpayers of this Nation to pull this along. At this time, I would like to very briefly go through, in summary form, the other aspects of the report.

I think it is important that members of the full committee have the full opportunity to get the flavor of what our hearings have been. On the 30th or 31st of July, the Senate passed the ERDA authorization bill. On the very next day, the 1st of August, I wrote to Dr. Seamans. I asked his opinion of sections 102 and 103, in the Senate bill. Despite a number of problems, we did not get a response until the 9th of September. I think it is most unfortunate that this big new loan guarantee program did not go through the legislative process. You have received an extensive five-page letter from my distinguished and esteemed colleague, Senator Jennings Randolph, in the course of which he spells out the large amount of thought, background and hearings in the Senate that have gone into the concept of these loan guarantees.

Now, if all of this background is available, why did it take until the 9th of September for the administration to have this idea and endorse the Senate bill? Also, to force the House conferees into a position of taking a major new program of this magnitude which has so much in the way of implications on the Governors of our States and on the people or where people will live or be housed or where they will get their water. I refer also to what the environmental impact would be. This is pretty horrifying in many instances.

Now, to try to digest all this legislation that has been sent up to us even as late as 10 or 15 minutes ago is difficult. On page 6, of the report, we detailed 13 questions that the Office of Technology Assessment has raised. We had discussed some of these but many of them are completely unanswered. Take, for example, question 13 on page 7:

What is the nature and extent of ERDA cooperative activities with other federal and state agencies in the areas of water availability, allocation of water rights and regional water quality maintenance?

On that point, Mr. Chairman, I will yield to Mr. Wirth because in the Colorado hearings I think he established some very interesting specifics on the availability of water or water rights in the State of Colorado. This had not been considered by either ERDA in formulating the plans or by any Government agency in launching this massive program.

Mr. WIRTH. Thank you.

On the subject of water, we are talking, regarding oil shale in this legislation, and about the Colorado River basin. Water in this basin is governed by an arrangement between the States in the basin and the United States and Mexico, allocated on certain amounts going to each State. Certain amounts are committed to Mexico. There is a great deal of controversy as to how much water Colorado has. We heard testimony from the Colorado River compact people and from the Governor of the State. It is very clear from that testimony that there is one very limited water availability situation. It is fair to summarize the Governor's testimony to say probably water is available for a modest demonstration program.

While the water is available, it is unclear what the cost of storage of the water would be and who would pick up the cost? What is the long-term impact of energy development in that area? This is unclear. The tradeoffs between energy development and agriculture in that region are also unclear. There is a complex of availability, legal, economic, and long-term lifestyle issues as to whether they want that part of the State to be devoted to energy or agriculture. How are the tradeoffs to be made? Water is probably the single most important variable as far as developing Colorado and much of the Rocky Mountain region. The water technical experts were not consulted by the administration in developing this. Their own group of people that operate that region were not consulted even though they had a task force that had been set up to look at it. Now, as Mr. Hechler pointed out there is a whole tangle of issues relating to water. Those issues have not been carefully looked into. Thank you.

Chairman TEAGUE. Thank you.

Mr. Mosher?

Mr. MOSHER. Just for the sake of perspective. Is it not true that in the program we are talking about, which contemplates around 12 to 15 major industrial operations throughout the country, that only one would be in Colorado as is now planned? I think we need to see things in perspective. Only about 20 percent would be oil shale. All we have talked about today is oil shale. This would only be 20 percent of the program. Of the two principal oil shale plants, one is in Utah and one in Colorado.

Mr. HECHLER. The one in Utah—well, just a moment. Go ahead, Mr. Mosher.

Mr. MOSHER. Although it is completely appropriate and indeed important that we recognize the questions raised here, I will say they are relevant and important. Nevertheless, in perspective they are a small part of the issue.

Mr. HECHLER. If you want to discuss Appalachia, we could discuss that. We could also discuss the four corners area, or the area of North Dakota.

Mr. MOSHER. Yes, I realize there are many areas to discuss.

Mr. HECHLER. We could discuss the Powder River basin area of Wyoming.

Mr. MOSHER. I understand that.

Mr. HECHLER. There are other areas very short of water at this time.

Mr. MOSHER. Do I understand correctly, Mr. Chairman, that about 20 to 30 percent of the program would be located in the so-called virgin areas where there is no particular social or economic interest?

Mr. HECHLER. I don't want to go in and rape the virgins, anywhere. It seems to me, that when you consider those areas that are short of water such as the Fort Union area in North Dakota or the Powder River basin in Wyoming or the areas of Colorado or the Four Corners area, all of which are short of water, whether it be oil shale or coal gasification. Here, I believe, that we have not received sufficient evidence from the administration that they have come to grips with the immediate problem.

Let me now raise the question which is a very important one. There are four areas or tracts eligible. Two in Colorado and two in Utah. They are eligible for loan guarantees.

Mr. WYDLER. Will you yield?

Mr. HECHLER. Yes.

Mr. WYDLER. We are being handed documents. I don't know what they are yet. Who is this from? Well—this says that the United States needs to begin now to demonstrate the feasibility of domestic synthetic fuels production. Who is it from?

Chairman TEAGUE. We can comment on it later. It is a poll from Mr. Harris. It is for your information. It is from Mr. Harris.

Mr. HECHLER. This looks like something—well, just a moment. I want to be sure I have this. This typewriter looks similar to the typewriter used by the Colony group.

Chairman TEAGUE. Let me read this to you.

Lou Harris, in 1974, at the request of the Colony Oil shale group and Shell Oil commissioned Lou Harris to do an indepth study of voter attitudes in Colorado toward oil shale development. Harris attests that the survey was conducted in 60 locations throughout Colorado selected by multi-stage probability techniques and provides a representative sample of the adult Colorado population, 18 years and over. The key question: Do you favor or oppose an oil shale development plant in Colorado?

The survey results are given. It shows in the central area—it shows the results of the survey. You can read this. It lists Central City. It lists the suburbs and the towns and the Western Slope and it shows how many are in favor and opposed.

I intended to go into this later, but you may do that right now.

Mr. WIRTH. May I comment?

Chairman TEAGUE. Yes.

Mr. WIRTH. I don't think there was any issue at all in any of the testimony that we received in the State of Colorado that we should not go ahead with demonstration program to prove oil shale processing. That is not the issue. The issue is how we are going about doing it. Are we going to do it a certain way. The issue that came up: Are we going to do it by throwing \$12 billion in a fashion—well, we learned 10 years ago that you just don't throw money into a problem to attempt to solve it. Hopefully, we learned enough to think through the issues we are facing such as the water issue and socioeconomic issues and the governmental issues, such as, what is the role of the State in the process? The issue is not if we are going to do it, but how? That goes to the roots of the problem. This poll has nothing to do with it. I agree we should go ahead with it. The Governor of Colorado also agrees we should do it. The planners that testified before us agreed. Everybody says we have to do it. The question is how are we going to do it? There are tremendous gaps and holes in the process as to how we are going to do it.

Chairman TEAGUE. Do you understand this as a mandatory program or whether it is up to the State? If we pass the bill, is it mandatory or voluntary for the State?

Mr. WIRTH. I think if passed in the current form it would be voluntary as far as Colorado is concerned. As Governor Lamm stated, the State would drag its feet in every possible fashion relating to every possible barrier it could set up. That is a process that is certainly not in the public interest and certainly not a way that we ought to go about the important task of energy policy.

Mr. OTTINGER. I wonder about the other piece of paper which says the United States needs to begin now to demonstrate the feasibility of domestic synthetic fuels production. Who wrote this?

Chairman TEAGUE. I don't know who wrote it. It was attached to the paper that I have.

Mr. WYDLER. It is a sensible statement but where does it come from?

Mr. OTTINGER. Did you ask the staff?

Mr. MOSHER. Is this the comment of the chairman?

Mr. HECHLER. If it is, I applaud the last sentence and I call to the attention of every member and hope every member will follow what it says in the last sentence

"Section 103 should be perfected by the House and enacted into law."

Now, I applaud that statement. Let the whole House act on this just as we have been instructed.

Chairman TEAGUE. The House will have the opportunity.

Mr. HECHLER. But will they perfect it?

Chairman TEAGUE. When it comes back from conference, the House can do what they want with it.

Mr. HECHLER. Now, I for one, and this is the first time I have ever said this before this committee but if sections 103 and 102 go to the conference with the dice loaded as it is with the conferees which we can count in favor overwhelmingly of these sections, then, I certainly have no other choice but to fight this on the House floor.

Chairman TEAGUE. I would expect the gentleman to do that if he feels that way.

Mr. WYDLER. I have listened to the objections that were raised in response to my question. If I could, my reaction is as follows: You raise a lot of important issues. Truthfully, they are not the issues that I feel are necessarily the major problems of the legislation. What happens in Colorado is important, yes. But Colorado has a lot of ways to protect itself.

Now, I am almost certain there would be a requirement for an environmental impact statement. It would give somebody the opportunity to raise the issues and get the proper answers. I am terribly concerned about this. The idea of loan guarantees concerns me. We are having a lot of discussion about the subject of loan guarantees.

I think it is important to know whether they are needed now at this time and if they are justifiable because the people will get something out of this or the Government or the people will. As to whether they are good for the water supply in Colorado that could be handled by Colorado later.

Chairman TEAGUE. Go ahead.

Mr. HECHLER. I don't think the point has been completely examined that you raised. This will place a few companies that obtain the guarantees in a very preferred position. The Chairman of the House Judiciary Committee in a 3-page letter, that all members of the Committee have, has raised a number of very serious questions as to the effect of loan guarantees on monopoly. Or enhancing the anticompetitive situation which is rapidly developing in the energy industry. I think it is a good thing at this point to read excerpts from the letter. This concerns the members of the House Judiciary Committee and all of us that are seriously worried about the growth of monopoly.

In the letter, dated October 23, which is at the very end of the summary report, Chairman Rodino said:

As Chairman of the House Judiciary Committee on monopolies and commercial law I am deeply concerned with the absence of competitive safeguards in

the Senate bill, creating a federal loan guarantee program for synthetic fuel plants.

In the third paragraph:

Unlike previous energy research program enacted by Congress, particularly the federal non-nuclear energy research and development act of 1974, S. 598 arguably does not vest in the government patents to any invention conceived in the course of or under any project guarantee by the government. Thus the owners of commercial synthetic fuel plants sheltered from substantial risk of loss by federal loan guarantees need not even share with the public any technological improvements underwritten by the public treasury. Section 2 of your bill, H.R. 9723 properly vests in the government any patent conceived in the course of a synthetic fuels project subsidized by a federal loan guarantee.

Neither bill currently—as drafted—provides for the disposition of patents as used in a defaulted project. In the event of default the Government may own or operate a synthetic fuel plant but not necessarily possess the projects most valuable assets. Now, I won't read all this. But it says:

I strongly urge your Subcommittee to require a synthetic fuel operator to surrender patents and know-how to the government in the event of default.

He says:

First, there is the serious possibility the federal government may inadvertently subsidized concentration in the energy market. The competitive problems inherent in government subsidies to construct new energy facilities are analogous to the problems faced by the federal government after World War II in disposing of surplus government aluminum and steel plants. Great care was taken not to increase concentration in the industries and every effort was made regarding the facilities to new or small entrants in the respective industries. The synthetic fuel guarantee program, it seems to me should face this same problem.

The issue becomes whether the federal government should favor the country's largest energy producers with loan guarantees, thereby further increasing concentration in the energy market to prevent the abuse of the loan guarantee program and to foster increased competition in the energy market. H.R. 9723 could be improved by interjecting the Department of Justice or Federal Trade Commission in the approval process for loan guarantees.

For each loan guarantee proposal either or both of these agencies should be required to issue a competitive impact statement to the effect that concentration in the energy market will not be substantially lessened.

Second, it may be appropriate for your Subcommittee to consider compulsory licensing with reasonable royalty provisions for any patents in projects certified for loan guarantees. The policy justifying the patent monopoly is that the monopoly will be sufficient to entice an innovator to market his product. But when the government and not the patent monopoly serves as the impetus for the innovator to enter the market the fruits of the patent monopoly should not be fully retained by the patent holder. Reasonable royalty compulsory licensing in this situation protects both the public and the patent holder. And it should be required as a condition for a loan guarantee.

My Subcommittee has held hearings on concentration in the total energy market. While concentration in the market is not inordinately high, it is increasing at an every faster rate.

Chairman TEAGUE. Excuse me, we are short of time.

Mr. HAYES. Would you yield?

Mr. HECHLER. Yes.

Chairman TEAGUE. You have had 1 hour. We have to hear from Mr. McCormack. I would like to hear him. If there is time left, we would go back to you.

Mr. HAYES. I think that your concern is about the total concept of the loan guarantee within the lending market and considering the debt structure and equity of the energy industry. Let me give numbers that the Chase Manhattan Bank put together. This was reported in Busi-

ness Week in an issue on investments in America. They say, for example, the petroleum industry worldwide needed and will need \$1.8 trillion between 1970 and 1985 assuming the 10-percent inflation rate continues and the annual growth and demand for oil averages 4 percent. They estimated the demand on world capital markets at \$445 billion. Its dependence on capital recovery or depreciation and write-offs would be \$490 billion. The industries profits or the oil industries profits during the entire 15-year period thus would have to total \$845 billion.

In the past 4 years, all the world's oil companies together, according to the estimates produced \$60 billion in net profits.

The point being made is that the remainder which is \$785 billion is practically an impossible goal to reach; that is, if you are going to use the growth rate Chase Manhattan uses which is 4 percent. This committee has recommended to the President an energy growth rate for this country of 2 percent. If you scale down our industrial size or the energy regarding oil particularly, say to the domestic needs, you see the kinds of demands for capital that we are talking about.

In the context of the section 103 type of legislation, we are talking in terms of \$6 billion within that bill. This is for the loan guarantees in oil shale and gasification. We are also talking about supporting prices outside of it. That is, to the tune of about \$41½ billion. That is \$104½ billion. We could leave the community impact as a side issue which includes water or day nurseries. Let us forget about that. However, who can a loan guarantee program help today if we do it? Are we going to get more oil? The answer is yes, if we put on a full commercial demonstration item. What can it be sold for? Is it \$17 a barrel? If it is gas is it \$3.50 or \$3.80 per thousand cubic feet. This means we have to support the differential between the market.

We are arguing as to whether to decontrol interstate gas up to the range of intrastate. We have the enormous spread. The beneficiaries can only be one. It is not the people exactly; it is the producers. Take the Colony Oil Shale project. Their manager told Business Week in April 1975 that they shut down. They did this because it was impractical. The man that runs the project in Colorado told me personally and other members of the committee—well, he explained why they left the group and split the leases. One, it was environmentally unsound and No. 2, you cannot make any money. The question is: Can you make any if they give us a loan guarantee? They would say, I am an engineer, if you want to throw money at me, I will show you how to spend it. That is the kind of assistance we are discussing.

Chairman TEAGUE. We are a little short of time. Excuse me.

Mr. HAYES. Mr. Chairman, I would just like to say this. Now, even the process holder knows a good deal when it comes up. Processing retail gas and selling it at the gas station is a good business deal. The other companies, such as Rio Blanco, don't think section 103 is that important. They think you are talking about going too big. For example, the research company for Sun Oil Co.; they were trapped in the Canadian project. They reported last Monday to us they had an \$80 million deficit. They are doing better now because the Canadian Government lets them get \$8.50 for the oil. They are still having trouble supporting the money for housing in the area and other impacts. Those are some of the business considerations that one can begin to assess.

Mr. OTTINGER. Will you yield?

Chairman TEAGUE. Just a moment. I now recognize Mr. McCormack. But first, was the loan guarantee feature ever brought up in hearings before it was placed in the bill by the others?

Mr. HECHLER. No, it was not.

Chairman TEAGUE. Did we not think about it? You intimated earlier the administration was responsible or the Democratic candidate for the Presidency contends it was his idea.

Mr. HECHLER. The reason he insists on it is he will lose jurisdiction if he does not get it through in this conference. He is afraid he will lose it to Senator Proxmire or Senator Long. That is why he is so adamant in his insistence.

Mr. WIRTH. It is my understanding we would try to put together the whole ERDA program. Now, to develop its policy and mission—then, the next step would be a look at synthetic fuels. We have scheduled hearings on coal gasification and so on. It was my understanding that was to be the next piece of legislation. That was the assumption that a number of us had been operating under.

Mr. MYERS. We seem frustrated over the \$6 billion interest in capital formation in the field of energy. We passed an increase availability of borrowing by TVA from \$5 billion to \$15 billion and did not seem too frustrated over it. If TVA wanted to use it for such a process, I don't think we would object.

Chairman TEAGUE. Now, I will recognize Mr. McCormack. Did you consider a loan guarantee prior to the Senate action?

Mr. MCCORMACK. Last year, when we wrote the Geothermal Act, we wrote the first loan guarantee program in existence for energy. We did not consider the loan guarantee program per se in our hearings this year. We have the loan guarantee features in the Electric Vehicle Act, which this committee reported; the House passed it earlier this year. We have had it in two separate bills. We have not considered it as an overall vehicle.

Now, as to my report, the Subcommittee on Energy, Research and Development and Demonstration held a series of hearings, a total of five hearings—two on geothermal energy and one on solar energy and energy conservation, and waste recycling. Also, one on capital formation at 8 o'clock this morning. This runs from October 1, the first meeting until today which is October 30. The members of the Senate testified and members of the Energy Research and Development Administration testified. We have had representatives of financial institutions, of utilities, oil drillers, and financiers, public and private utilities, and people in solar energy. We have had the American Can Co. regarding urban waste conversion. Also investment houses and law firms. We heard from industrial organizations such as Corning Glass, which is working on energy conservation in industry. We had regulatory commissioners and we had representatives from Chase Manhattan Bank today. We heard from OMB. Also, from the Treasury, ERDA, and the FEA. Throughout the entire series of hearings there has been no attempt to bring the subcommittee or its members to any recorded position. We have not had any policy papers. I think there are some general conclusions. I will try to paraphrase them. I think these represent the general thinking of most members of the committee.

The first is, we must act now. The \$6 billion loan guarantee program was dropped into our lap like a fumble in a football game where we found we are on the defensive team. The ball is bouncing around. The question is to pounce on it or not. I think the answer is yes. It has been 2 years since the Arab oil embargo. There has been a great deal of criticism of the Government and administration and the Congress by the administration and others. Much was unfair. The Committee on Science and Technology provided a great deal of leadership for the entire country and for the administration in solar energy and geothermal energy and waste conversion, electric power, and Non-nuclear Act of 1974. Also, basic research and development and the ERDA authorization bill.

Earlier this year, the President criticized Congress saying we were chicken on energy. I say that is unfair. Now, it wouldn't be fair if we dropped the ball on the \$6 billion. That is, I think it would be far worse if we did this.

We have to get at the business of building demonstration programs. We have to face the fact they will cost a lot of money. The money is not out there unless there is some sort of guarantee. The next conclusion is section 103 presents what is generally a constructive and reasonable concept. Perhaps it has a lot of bugs in it or some omissions. It is a vehicle that we probably would not have again, if it is dropped. It is highly unlikely that similar legislation could be enacted in this Congress because of the jurisdictional struggles and other political problems that would come up.

We have an opportunity to strike a blow for freedom. We think section 103 is the vehicle. We think the program should be expanded. The language is fuzzy about what it includes. They talk about synthetic fuels. They talked about amendments in the Senate. They talk about renewable resources. We have concluded it should be expanded, particularly from the testimony we received. It should include all energy technology, solar, thermal waste, and conservation programs.

The next point I want to make, is this is not an impetuous act. This committee has enacted legislation of far more reaching profound impact on this country in much shorter time and with much fewer hearings. The subject has had intense study by the two subcommittees. Congressman Hechler's committee and the members that have been active in it made a real contribution in raising questions. They are peripheral questions to the main thrust of the amendment. They should not confuse us in considering the amendment. They make a contribution. The administration, having the ball dropped in its lap, as we have in our lap; well, I think it has done a commendable job pulling itself together and getting organized and making an intelligent and constructive response to the questions.

I sympathize with the members of the administration. They have as many jurisdictional problems as we have in Congress. They did not know where they were going at first any more than we did. They did a great job in working out details on the proposal. I don't agree with all proposals they made, but I commend them. I also point out this is not a completely new idea, coming out of nowhere. We received correspondence from the Senate from Jennings Randolph, dated October 24, signed by Mr. Randolph and Senator Church and others. This docu-

mented research and discussion going on regarding this subject. I won't go into detail on this. The members do have a copy. The fact is that this is not something we are pulling out of the sky.

The next thing is that the act sets up a program to allow ERDA to loan money to a limited number of commercial demonstrations. It does not in itself, impose anything on anyone. A lot of the peripheral questions raised about water or social or political impacts or coordination with local government; they are not imposed upon anybody. Now, to be specific and without meaning to be personal there is nothing that says the programs have to be carried out in the State of Colorado. Now, under the program we would have a limited number of commercial demonstration plants in all aspects of energy conversion in various parts of the country as appropriate.

The conclusion, and it comes from the previous discussion, is we don't have to answer every question now that may arise from these programs. I think if we attempted to do this with all legislation we would never pass anything. We have to face the fact there are going to be problems in the future. I lived through this. I spent 20 years in Richmond, which is a Government constructed city built out of sagebrush. It is now a city of about 30,000 people. It was built by the Manhattan project and the Atomic Energy people. They have lived with these problems. I came back to Washington twice on public subscription to lobby on legislation that impacted on us. This happened 15 years after the program was started. This should not keep us from proceeding. We cannot allow ourselves to be frightened by the unknown into not acting to solve the energy matter. There are problems of antitrust and environmental protection and social and economic problems and water and so forth. These are problems ERDA is required to handle under the law today. There is nothing in this bill giving ERDA authority to run over any local government.

There are dozens of programs existing today that will be called into play to implement the programs as far as the impact is concerned. Bearing this in mind, Mr. Chairman, some of us sat down and tried to go through the whole idea of section 103 and speak to the major questions attached to it. We worked over this last weekend. The staff worked an incredible number of hours. The minority staff worked on it. We had a meeting with Congressman Mosher, Congressman Thornton, myself and the staff and legislative counsel. We drafted our own version of section 103. It was delivered while the meeting was in session. We will give this to you. It is not for any deliberation at this time. And not for any reaction at this time but it is to ask for your consideration of it.

Now, what this attempts to do is to speak to some of the questions raised responsibly and constructively, and ask ourselves what the questions really are. Now, having asked ourselves that, we would ask what the practical solutions under the law would be to try to draft this accordingly. What we wind up at present would be the original Senate version of 103 and the administration version of 103 and the bill submitted by Congressman Hechler or the others, on the same subject. We have four fairly serious considerations of this particular subject matter. I would submit that the members or the conferees could sit down with the staff and go over these versions and the questions that are raised. I think you could easily come to a responsible version which

could go into the law. I will ask Mr. Thornton to answer questions about the draft of section 103. He is more qualified on this. He did not draft it. He helped make some of the policy decisions and contributed some of the words.

Chairman TEAGUE. Do I understand this is a suggested substitute for the Senate language?

Mr. McCORMACK. Yes; we submitted it to the conferees to be considered with the Senate language. We are not trying to preempt anyone. This is our response as of last weekend to what has gone on before or the testimony we heard and the questions raised.

Chairman TEAGUE. Mr. Thornton, you may proceed.

Mr. McCORMACK. May I say this first?

I would like to read a little clip from a magazine that I received here from Science and Technology Magazine, a recent edition.

India Encourages Production of Gas From Manure—The government of the Indian state of Haryana will lend farmers \$4 million to build 10,000 gas generators for converting cow dung into gas for cooking, lighting, and running diesel engines. About 2,500 of these small plants, or "gobars," are already in operation in Haryana and Andhra Pradesh, producing both a 650-Btu gas and a sediment that makes excellent organic fertilizer. With a goal of installing 100,000 plants, the Indian Government is offering other loans and technical assistance in an effort to ease the food and energy shortages. A larger plant with a capacity of 100,000 CF is being built at Indris to run a diesel generator. Cow dung plants are among the alternative energy sources being considered for use in rural Asia by the U.N. Committee on Natural Resources now meeting in Bangkok.

Can we do less?

Mr. OTTINGER. I am a member of the subcommittee. Those views are not in accord with mine at all. The subcommittee was not asked or polled on this. I think this program represents a distortion of priorities in very serious proportion. The gentleman this morning from the Chase Bank indicated quite clearly that a loan guarantee program would create no new capital. It is a question of the Government entering into the capital market, creating preference. The priorities of subsidizing oil companies and encouraging further concentration on speculative energy resources, seems to me to be misplaced.

Chairman TEAGUE. I would appreciate it if you would be brief.

Mr. OTTINGER. There is a lack of emphasis on energy. It is very serious. Now, those energy resources eligible for loan guarantees, well, I think they will end with an infinitesimal proportion of the loan guarantee program. Equally important, we will have no say. This legislation represents a serious transgression on our prerogatives. It will eliminate adequate House action on this bill. The House will not have an opportunity to offer amendments when the bill gets to the floor. If the legislation is adopted it will remove the House of Representatives and the Senate from participating in the decision on where the money will be spent within the energy field itself.

There are serious antitrust implications to this, as the Chairman of the Judiciary Committee indicated. There are serious environmental threats. I will do everything I can to see that those are addressed. I think large portions of the United States will be subjected to very severe environmental consequences over which they do not have adequate protection. I, as one member of the committee oppose the position of my Chairman on this point. I think the legislation would be disastrous.

Chairman TEAGUE. Mr. Thornton may proceed.

Mr. THORNTON. I should like to begin to reflect that my own concern in this area is one that runs back better than 2 years. This is before the energy crisis was enunciated. It was not a matter of national policy but we were headed toward a depletion of certain forms of fossil fuels. Also, it was necessary to begin massive efforts to overcome those shortages. Now, in the area in which we find ourselves I want to say further that I have been privileged to serve on both energy subcommittees. We have had good hearings in both of the subcommittees. I join with Chairman Hechler and Mr. Wirth in proposing a piece of legislation intended to highlight the problem areas which have materialized during the hearings that have been held. The basic underlying questions which must be resolved is whether this nation at some point in the future and before the end of this century is going to need to obtain a synthetic fuel capacity. If the answer to that question is affirmative then now is the time to begin. This is so that we may proceed in an orderly and effective way to continue to keep before us the impact upon our communities, our states and our people. This is instead of waiting until the problem becomes as acute as it was a year ago, at the time of the embargo; and crash programs or hasty actions are the only way to resolve difficulties.

There are a number of subsidiary problems to the one basic issue. A particular question is when are we prepared to decide those subsidiary problems? At what level of information and background can we make those decisions? In my view, the problems have been highlighted by the very effective hearings that have been held. I think they are large. But I don't think they are insuperable. I believe we focused on the problem areas and we now are prepared as a legislative body to deal with the subsidiary problems and move forward with the basic thrust of this legislation.

I am certainly aware that the procedure is as described by Mr. McCormack somewhat in the position of retrieving a fumbled football. We had to start late. We had to start with great effort on the part of the staff and members of the committee. I, for one, think that we have gained a tremendous amount of information during the course of the hearings. I think we can address these problems. I don't know if you want to go through each of the problem areas, that I found most concerning to me or what resolution that I think is appropriate. We drafted some of these in the legislation. We have a draft which, very frankly, I have read thoroughly today for the first time. It addresses these particular areas. I would be pleased to go through them.

Mr. WYDLER. Are we going to vote on anything relating to this matter today?

Chairman TEAGUE. There will be no votes or rollcalls.

Mr. THORNTON. The area of antitrust is one of great importance. Everyone knows this. There should be no government effort to increase proprietary rights for one person as against his competitors. We have basic provisions of patent law which are applicable to the particular problem area. Now, under the draft of the bill, ERDA would have authority to enter into appropriate agreements with regard to the patent policies which will be followed in the event of default or operation of the system. There are questions such as proper licensing of technology. This would be entirely appropriate. In the draft that has been mentioned, I suggested it would be appropriate to

provide ERDA to consult with the Department of Justice or the Attorney General with regard to the competitive features of any loan guarantee. This is in order to ensure that the antitrust laws of this country are not mitigated or changed in any way by this legislation. There are, of course, several other questions with regard to state and local consultation. I feel that should be provided; that we do need to involve the local governments in the process of making these particular decisions. It is not with a veto power as with the instance of the deepwater ports legislation but a provision for consultation regarding the design of the system.

I think it is appropriate that we provide for assistance to communities to solve their impact problems. Merely guaranteeing a bond issue may not be sufficient. I think it is also appropriate to give ERDA some flexibility as to other methods of providing help to communities that have impact problems that might result from the synthetic fuel program. I think it appropriate that any particular agreement be submitted to the Congress for review in order that we have an opportunity to express our views with regard to any particular guarantee.

I could go on with these questions but the point is, Mr. Chairman, that we have a body of information that I think is sufficient to now address the subsidiary questions. Our attention should be turned to the basic question that I outlined first. That is, whether this nation has a need for this kind of demonstration project which standing alone, will not make an enormous difference in our requirements of oil and gas. But the technology that would be developed would be sufficient to enable the country if that need arose to expand the facility so that by the year 2000, as much as 10 million barrels of oil a day might be produced by this particular source if that need materializes.

Mr. BELL. I want to associate myself with the remarks of the gentleman. That is, with Mr. McCormack. I concur with every thing Mr. McCormack said. I am very concerned. I think the Nation is in serious trouble with energy. We have reached a crisis position. During the embargo almost 2 years ago, we spent \$4 billion for oil and gas that we did not have. We had to import it. This year we spent \$26 billion. It is closer to \$30 billion with new prices. We are talking about backing an investment that might cost \$2 billion over a 5 year program and if the continuation of having the shortage of oil persists—well, this would amount to \$130 billion just with current prices.

I think this is a very serious matter. I think the Congress is being delinquent in the delays we are talking about. There are all kinds of reasons they tell us why we should not drill offshore or why we should not decontrol oil or gas or why we shouldn't start on synthetic plants. When are we going to get started or do something? I think Congress can be accused of being delinquent if we don't act. The time is running out, my friends. We better act. I certainly agree with the gentleman. I agree with Mr. McCormack and commend him for his fine work.

Chairman TEAGUE. Will you yield?

Mr. HAYES. I am a member of Mr. Hechler's subcommittee. I have enormous respect for both of you. I have learned an amazing amount of

not only information but how to think about very unfamiliar problems in many ways that I never had to be exposed to. I want to thank you. I want to tell you simply that one of the things that has impressed me about your approach to the energy problem has been a willingness to put aside a lot of really very collateral kinds of issues, that while they are important, they still don't get to the basic gut question.

Now, along that line, one of the things has been that you warned not only the Congress but the Nation about wrestling to get deck chairs on the Titanic. Now, when we involve energy issues that don't go down to the ultimate solutions that we are all looking for, then we are wasting a lot of time.

We are possibly wasting a lot of very valuable intellectual and real assets within that framework when we, as a part of our fossil solution began to zero in on a half hour a day supply of oil or to zero in on very short term supplies of synthetic gas; that is, by committing an enormous amount or a brand new concept in equity financing to the program. Then, don't you think that can and does run counter to the kind of things we ought to be doing. The operation ought to be orderly and effective. What if we committed the same kind of assets to other energy areas. For example, the electric utility industries that will have to raise about \$500 billion between now and 1985 to pay for new capital investment and the petroleum industry which needs \$380 billion. The coal industry needs \$25 billion. Don't our priorities then become more obvious in terms of what we should do? Think of nuclear development.

Mr. McCORMACK. I think this perspective is one that one has to thoroughly examine. I think you are right. We have to look at this. We have to see what the trade offs are. And what the profits are in any such program. There is one thing we have to take into consideration. In a contrasting manner, it is sort of like the electric car bill. Not only are we in an energy crisis, but as a corollary to it we are in a crisis of running out of portable fuels and natural gas.

We have to do several things at once. The electric car is an attempt to shift away from dependence on petroleum for transportation. The programs of nuclear or coal, are attempts to reduce our demand for petroleum or natural gas by taking it out of electric generation. The synthetics program is to provide a substitute for our existing sources. I think of us today in these programs as we move into the demonstration phase as being comparable with the breeder program. It is expensive. We are near commercial levels. I think the decisions we make in the 1980's as to how commercial we would go or exactly what technologies we follow, that this will flow from the information we get now. The \$6 billion that is earmarked or the \$2 billion is a very small portion of the entire budget.

It is a small portion of the \$161 billion of outstanding federally guaranteed loans. It is a drop in the bucket. We have to go with this so that we have the knowledge and information and technology to turn this on when we need it.

Mr. WYDLER. I will ask this of Mr. Thornton.

The thing that bothers me about the proposition basically is: Whether the Government is buying a lot of white elephants. We would put up the plants and the loans are guaranteed. Suppose it turns out they are not economically sound and nobody wants the oil that badly?

The companies would say OK, take the plant over, it is yours. I read the bill. There is a 25-percent investment by the companies. I am little nervous about those provisions, 25 percent is like the FHA guarantees—you are guaranteed 80 percent of the cost. It was really over 100 percent when you got the money for the mortgage. The guy could walk away from it right away. He would make his money. Now, how are we going to control the fact if it is a \$400-million plant. What are you going to do about this?

Mr. THORNTON. I am not sure. I think that a large portion of the answer relates to the administration of the program. It would be the congressional intent that these be real dollars and the equity financier would be required to come forward with 25 percent of the cost of the plant. This would be a risk to the private investor. Now, I would assume that would be faithfully followed by the administrator of the program and as mentioned in the suggestion we made that any guarantee would be put before the Congress for an opportunity to review it.

Now, testimony before our subcommittee indicated some interesting factors regarding the mechanics of your question. One of the oil shale companies proposing to build a plant stated they would not need the price supports. With a loan guarantee they could, according to the projections they have in their plant experience produce oil on the market at a price lower than that of the Alaskan pipeline. They considered the margin between the Alaskan pipeline oil and their produced oil is sufficient and that there would be no question as to the market for the shale oil. Other companies suggested price supports would be needed or perhaps even grants might be appropriate. This was the Colony group that made this observation. The natural gas pipeline companies that have already made application to the Federal Power Commission, for authority to purchase synthetic natural gas from such facilities indicated that the price level of their anticipated production would run in the range of \$21½ to \$31⅓ per thousand cubic feet.

This is somewhat above the present market price of intrastate gas. However, it is not completely outside the ballpark. Nor the ballpark of what it might be in future years. In these instances, the testimony is that the price level is near. It is also interesting to have a disclosure of what benefits would accrue to having the plant at 75 percent of its cost. That is, if the Government had to take over the operation of a plant or had 75 percent of the cost involved, then the cost of the product itself would be lower. This is as a result of the lower investment. This is a factor that was also demonstrated by some of the exhibits included in the testimony. I have tried to answer your question.

Mr. MYERS. May I say this?

Chairman TEAGUE. Mr. Myers.

Mr. MYERS. We have heard statements today about the fact that we are starting at the 50,000-per-day barrel level. Some state that we know we can build a 6,000-barrel-a-day project and make it work. I think what is important is the fact that we could all agree the program is not going to have a serious impact on total demands either for capital or actual fuel, in the 1980's. It is a single chance to learn something about the size of the projects that we think we have to deal with in the future. I don't think it makes good sense to go out and spend a lot

of money on things we know that we can accomplish. It is a challenge with reasonably good risks. I think that is what we should aim at. There are uncertainties in the 1980's and 1990's.

Chairman TEAGUE. May I take 30 seconds for a unanimous consent requests? It is that we substitute H.R. 10230 for H.R. 9058. On October 9 this committee reported unanimously the Science policy bill with amendment. The committee directed a clean bill be introduced. That bill has been introduced. I think nearly all committee members names are on it. What I ask is a pro forma request by the full committee for action on it.

Is there any objection? I hear none.

It is possible the bill may come up tomorrow.

Mr. GOLDWATER. As to the Chairman of the Energy Research, Development and Demonstration Subcommittee, speaking for the members of the entire subcommittee; I think who is speaking for would be those that support him. Now, I neither endorse nor reject Mr. McCormack's statement. I think it is a good statement. I, for one, represent the side of the question which is—well, I am not satisfied all questions have been answered.

Therefore, I would like to explore for a few minutes some of the reservations that I have. I agree that we do have a national need for becoming self-sufficient in energy of all types. The sooner we do this I think, the better for our own national security and our health. The question I think we have to constantly explore and I think it is an important process because it is a relatively new subject not only to this subcommittee but for the Congress. How do we proceed? Do we proceed in haste or with thoughtful consideration?

I would conclude thoughtful consideration although, perhaps a longer period of time may result in more meaningful steps or solutions. I am hopeful that throughout all of this we could not proceed or should not proceed with so much haste that we are ashamed of the end result. We are in this effort, really to decide the priorities. That is what it gets down to. Where do we direct our national resources or our economy?

I think this is an appropriate subject or procedure for this committee. I commend the Chairman and also Mr. McCormack for allowing this kind of discussion to take place before we go into the conference meeting. I would submit, at this time, that except for a certain tax policy or price regulation which is being debated, and for only a few bills that came out of the committee, such as the solar energy or the electric vehicle that we never really interfered to a great extent with the economy or tried to redirect or allocate credit or capital as it regards energy matters.

Here, we are beginning to move into this area. We are beginning to consider the direction that capital will flow or that priorities will take. We are obviously making a major policy decision. We are talking about a \$6 billion loan guarantee, with price supports that may very well cover \$10 or \$12 billion. Behind this is a great debate on the energy independence authority. That is a \$100 billion loan guarantee matter.

We are making a major policy decision that has to be considered. The question that faces us is: must the Nation start now to build a new synthetic fuel commercial demonstration program to establish

economic, environmental, and technological feasibility? I think that is the question we are trying to decide. Whether this is the direction we want to go.

Also, how important the synthetic business is and will it help solve our national need for self-sufficiency. I submit, we may not be prepared to make this decision in the context of thoughtful consideration. I have concluded that there are perhaps many more questions that are unanswered than have been answered. Also, we may be grasping at something that is attractive or politically appealing. It might be the panacea for all of our problems.

What is the magnitude of our national need? How severe is it? How does nuclear energy fit in? What about the 1980's? What about the potential for fossil fuel, especially coal? Is the loan guarantee the only way to go at arriving at the solution?

What is the economic impact? There has been very little discussion. Except for this morning and I appreciate the Chairman for calling the meeting. What is the economic impact? Do we consider this question of loan guarantees in a vacuum?

The Treasury Department raised the important question of deregulation. It is their position we really should not embark upon loan guarantees without considering deregulation or the economic effect that it would have in attracting new capital.

Other things that bother me would be the economic distortion or exclusions. How does this affect capital availability? What are the alternatives to this approach? What about the anticompetitive nature that was raised by the Judiciary Committee? This has not been considered. What about the safeguards to proprietary information? There are questions of patent protection. I wonder about ERDA. It is a new agency. We have struggled with their organization. Are they properly organized to manage a program of this type today or next year?

What is the impact on the environment or the social situation? These questions have not been answered. I would also ask the committee, what the hurry is? Perhaps, more discussion should be had. I think it would be more fruitful to take more time. I therefore conclude that, we are carving a monument to the Congress and I'm wondering whether in the end, we will be proud of our results? We are steamrolling down a road full of obstacles not knowing where it may lead. Nor where it will take us.

Finally, Mr. Chairman, I personally feel we are leaping out into space not knowing where we will land. I raise these questions because I think they are important. The monuments that we build, I want to be proud of. The solutions we come up with, I want to make sure that they meet the proper questions and have the solutions.

Now, although I do raise these questions and I think they are legitimate questions, I personally would reserve my judgment on a final decision as to supporting this new venture.

Mr. WYDLER. The committee print we received today; does it contain the amendments that are suggested in the letter of October 30?

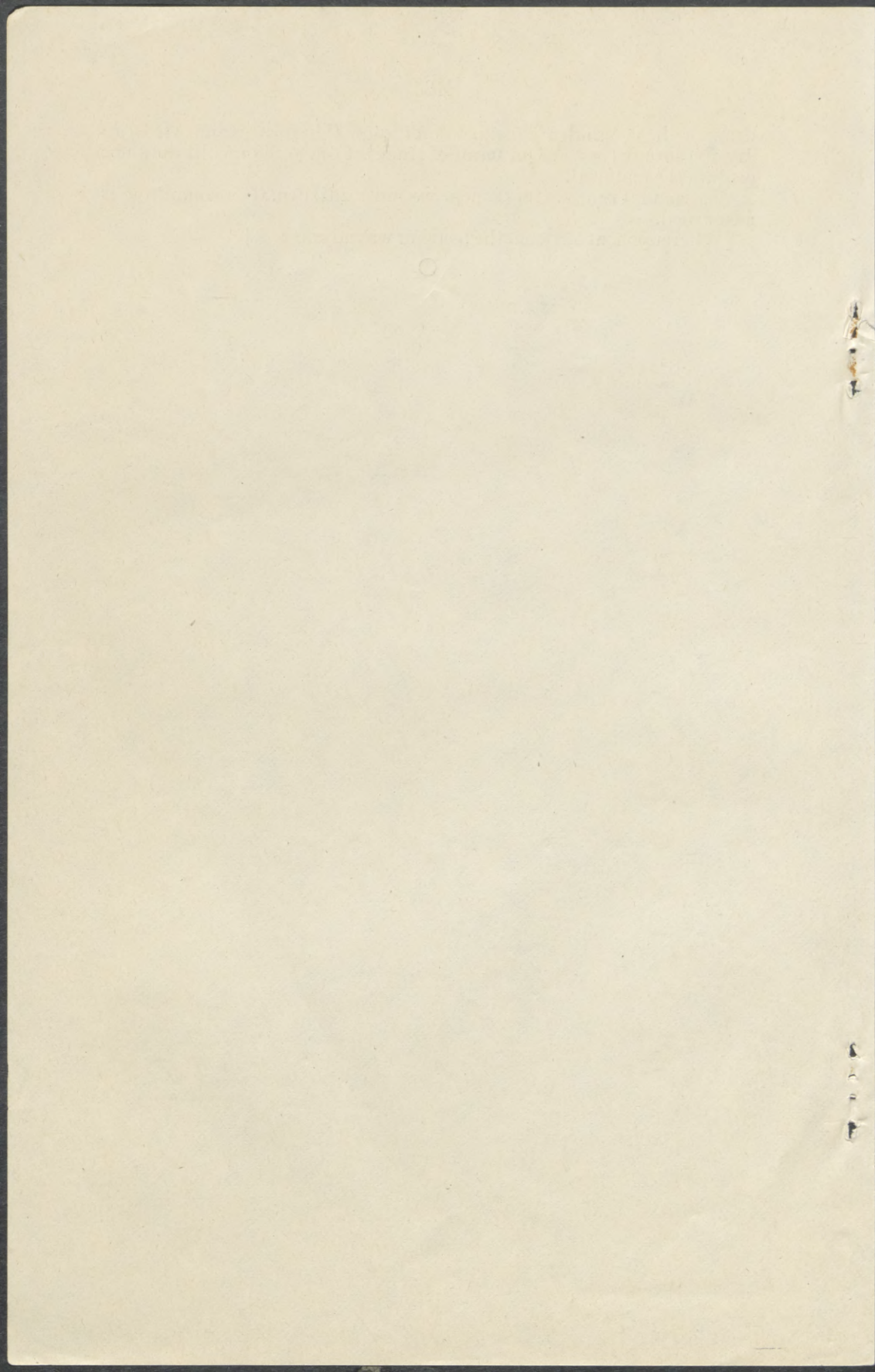
Mr. McCORMACK. It does not. Those are separate. They are on a completely separate track. They are parallel but they are separate. I have not had a chance to digest the October 30 letter. I suspect part of the content of it came after they reviewed the material in our

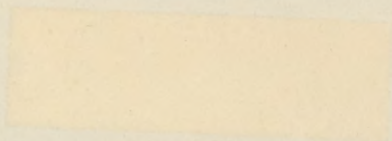
draft or the rough draft form. I don't know this for certain. All I can say for sure is they are on parallel tracks. I am sure our bill does not contain the material.

Chairman TEAGUE. Gentlemen, we must adjourn. The committee is adjourned.

[Whereupon, at 12 noon, the hearing was adjourned.]









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