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STRATEGIC PETROLEUM RESERVE

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HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND POWER

OF THE

COMMITTEE ON

INTERSTATE AND FOREIGN COMMERCE

HOUSE OF REPRESENTATIVES

NINETY-FIFTH CONGRESS

FIRST SESSION

ON

CIRCUMSTANCES RELATING TO THE STRATEGIC
PETROLEUM RESERVE PLAN

FEBRUARY 16, 1977

Serial No. 95-54

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Matteotti, Dennis, Auditor, GAO operations, Federal Energy Administration.
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New England Council, Zeb D. Alford, Chairman, Energy Committee.

New England Fuel Institute, Donald B. Craft, executive committee.

Petrochemical Ecology Committee of Louisiana, Joseph W. Cole, Jr.

STRATEGIC PETROLEUM RESERVE

WEDNESDAY, FEBRUARY 16, 1977

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND POWER,
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to notice, in room 2123, Rayburn House Office Building, Hon. John D. Dingell, chairman, presiding.

Mr. DINGELL. The subcommittee will come to order.

This morning the subcommittee will conduct its inquiry into and scrutiny of the strategic reserve plan which was defended pursuant to the Energy Policy and Conservation Act of the last Congress which has been submitted to the Congress for congressional review.

The subcommittee is holding the hearings this morning to discharge the responsibility of the subcommittee and to inquire into the circumstances relating to the plan. The subcommittee approaches this matter with an open mind and is pleased that we have the cooperation and the assistance of the Hon. John F. O'Leary, the Federal Energy Administration Administrator, who is accompanied by Mr. Thomas Noel, Assistant Administrator, Office of Strategic Petroleum Reserve of the FEA.

Gentlemen, we are delighted to have you with us. If you will each identify yourselves for the assistance of our reporter, we will recognize you for such statements as you choose to give. The Chair does inquire at this time, is there anyone else you would like to have at the table with you?

STATEMENT OF HON. JOHN F. O'LEARY, ADMINISTRATOR, FEDERAL ENERGY ADMINISTRATION, ACCOMPANIED BY THOMAS E. NOEL, ASSISTANT ADMINISTRATOR, OFFICE OF STRATEGIC PETROLEUM RESERVE

Mr. O'LEARY. No, Mr. Chairman.

Mr. DINGELL. The Chair does observe that Mr. Noel has been of considerable assistance to the committee and his functioning in this matter, and he has been quite cooperative with the staff. For that reason we are particularly pleased that you are with us this morning, and thank you for your assistance to our staff. We would like you to know that we appreciate that.

Mr. NOEL. Thank you.

Mr. DINGELL. If you will identify yourselves, I will recognize you.

Mr. O'LEARY. I am John F. O'Leary, Administrator, Federal Energy Administration.

Mr. NOEL. I am Thomas E. Noel, Assistant Administrator, Office of Strategic Petroleum Reserve.

Mr. O'LEARY. Mr. Chairman, I have a prepared statement which I will read with your permission. It does cover the points I would like to get on the record. Therefore, I would like to go through it with you.

Mr. DINGELL. All right.

Mr. O'LEARY. Mr. Chairman, I am pleased to be with you today to discuss the strategic petroleum reserve (SPR) program. I will begin by giving you some background information on the strategic reserve and how it is being developed and then have Mr. Thomas E. Noel, who is out Assistant Administrator for this program, explain our plans in greater detail and answer any questions which you may have.

THE NEED FOR A RESERVE

The interruption of petroleum supplies during the winter of 1973-74 and the resulting petroleum shortage caused severe economic impacts on the U.S. economy and emphasized our vulnerability to interruptions in imports from the major oil exporting nations and to other supply disruptions.

There has been considerable discussion and debate since that time, but little consensus, as to which are the best measures to increase energy conservation and domestic energy production to reduce our dependence on foreign oil. However, one truly constructive proposal growing out of the last embargo, which appears to have widespread bipartisan support, is the strategic petroleum reserve program.

After the last embargo, a number of bills providing for a strategic reserve were introduced in the 93rd Congress. The strategic petroleum reserve program ultimately became a reality, in December 1975, as part of the Energy Policy and Conservation Act. The act, declaring it to be U.S. policy to store up to one billion barrels of petroleum products, provides for an early reserve to contain at least 150 million barrels by December 1978, and for an eventual storage system of at least 500 million barrels by December 1982.

It is estimated that a 500 million barrel reserve, combined with conservation measures, can essentially replace lost imports, for a period of 6 months for the most likely interruptions. In addition, the mere existence of the oil reserve may serve as a deterrent against future oil import interruptions.

HOW THE PROGRAM WILL OPERATE

For the past year, as the level of our petroleum imports has increased, the FEA has worked to design the most efficient storage program possible within the legislative guidelines. Since the basic purpose of the program is to replace interrupted supplies, thereby keeping the existing supply and distribution system operating effectively, FEA identified those areas of the country most dependent on imported oil.

The three market areas most dependent on oil imports that are likely to be interrupted are: The interior of the country served by the major crude oil pipelines fed from the gulf coast; the gulf coast refinery complexes; and the east coast and Caribbean refineries.

More than half of our crude imports (56 percent) presently are received on the gulf coast; 25 percent are received on the east coast and 16 percent are received in U.S. Caribbean refineries.

In order to plan a reserve of the appropriate size and design to effectively diminish the Nation's vulnerability to petroleum supply disruptions, a wide range of possible import interruptions was considered, and the work in this regard was coordinated with the national security agencies. Based upon our past experiences, the conclusion reached was that the program should be planned to meet a supply interruption of about 3.3 million barrels per day.

The storage program would be a key part of our strategy to deal with this kind of emergency. It would, of course, be coordinated with standby mandatory conservation measures and with our partners in the International Energy Agency and complimented by the use of private sector inventories.

To put a 3.3 million barrel per day supply shortfall in perspective, during the 1973 embargo, our crude shortfall was 1 to 2 million barrels per day. The loss of crude oil to various areas of the country resulting from a 3.3 million barrels per day shortfall would be as follows: East coast refineries would feel a loss of 820,000 barrels per day; the Caribbean, 420,000 barrels per day; and the gulf coast, 1,890,000 barrels per day.

Since it is expected that there would be no more than a small loss of imported refined products during an interruption and that these amounts can be made up either in slightly reduced consumption or by adjustments to refinery yields, only crude oil will be stored in the reserve.

The storage of crude also provides flexibility of response to a wide range of interruptions by providing crude oil to refineries which have the flexibility to adjust yields for the production of the necessary products to meet the specific needs of an interruption.

The analysis of refinery capacity expected to be available in the 1980's shows that the refineries will have more than adequate capacity to produce the desired products on a timely basis. This avoids the costly need to store refined products, which may not remain chemically stable in storage for long periods, under less preferable environmental circumstances.

In determining where storage sites should be located so that the reserve oil can function as an effective replacement for these lost imports, careful consideration was given to the existing petroleum refining and transportation network. This brings me to an important point about the philosophy underlying the design of the reserve system.

Basically, FEA believes that the Government should not expend funds or commit labor resources to the construction of distribution facilities that the private sector is willing and able to undertake. In effect, the Government should not duplicate components of an oil distribution system that already exists.

In essence, the storage sites will be located where they are most accessible to existing tanker or major crude oil pipeline terminals, or both, to provide for rapid withdrawal during an interruption and to permit the reserve to be used for a wide range of interruptions.

The locations that provide the greatest flexibility are in the gulf coast because that area already receives the majority of imports and provides ready access to the primary imported crude oil distribution system of the country. Storage in this area can feed the major crude oil requirements of the interior, the gulf coast refineries, and east coast, west coast and noncontiguous area refineries by pipelines or tankers, or by combinations of the two.

STORAGE SITES AND FACILITIES

In order to determine the most efficient and cost-effective mode of storage for the reserve, a number of alternative types of storage facilities were examined. Among those considered were solution-mined caverns, conventionally mined caverns, surface tanks, mothballed tankers, depleted oil wells, shut-in oil production, and others.

The analysis has shown that salt dome caverns, mines, or rock caverns are the lowest cost forms of storage. Underground storage also minimizes environmental problems and at the same time provides maximum security.

Eight candidate sites—three salt domes, with existing leached caverns, and five existing mine sites—have been selected for possible development for the early reserve. The candidate sites are grouped by proximity to major crude oil distribution centers, as follows: At Freeport, Byron Mound would serve the Texas/Seaway pipeline; West Hackberry would serve the Texas/Texoma pipeline at Nederland; Kleer Mine would serve downstream Texoma; and Bayou Choctaw, Weeks Island, and Cote Blanche would serve Louisiana/Capline at Saint James.

Each of these sites could also serve local refineries and other areas of the country by tankers as well. The Central Rock and Iron-ton Mines would serve the Ashland or Mid-Valley pipelines. In this manner, crude oil stored in selected sites would be used to replenish petroleum supplies lost during an import interruption.

REGIONAL PETROLEUM RESERVES

Reserves for those regions of the country heavily dependent on imports, as well as reserves for noncontiguous areas of the country, will be maintained in the large central crude oil storage facilities. During an interruption, crude oil from these facilities will be allocated to refineries to assure an equitable distribution of available supplies, thereby permitting a continuous flow of products through the distribution system.

FEA has concluded that sufficient transportation and refining capacity will be available to distribute and refine centrally stored crude oil with no inequitable effect on either import-dependent regions or noncontiguous areas. The availability of crude oil and refined product inventories for the regions and noncontiguous areas, combined with imports in transit, will provide adequate time to obtain crude oil from the central reserve, transport it to refineries, and distribute the refined products to users before import-dependent regions or noncontiguous areas are impacted in the event of a severe supply interruption.

INDUSTRIAL PETROLEUM RESERVE

FEA is authorized by the Energy Policy and Conservation Act to require petroleum importers and refiners to store 3 percent of their throughput or imports as an industrial petroleum reserve (IPR). After weighing the advantages and disadvantages of exercising this discretionary authority and based on comments received during a public hearing, the FEA has decided not to exercise its discretionary authority at this time.

Current analysis shows that an IPR would probably result in higher costs to the economy due to the higher costs of storage developed by each refiner and importer. An IPR could also result in adverse impacts on the competitive environment within the petroleum industry and upon the competitive position of individual firms.

Most importantly, dispersal of a portion of the reserve through an IPR could reduce the overall effectiveness of the reserve in responding to a variety of supply interruptions. We recognize that the use of the industrial storage authority could force the direct beneficiaries of the program, rather than the taxpayers, to pay for part of the program.

We will continue to study the use of industrial storage, and of petroleum inventory levels to be maintained by industry, as a means of reducing U.S. vulnerability to interruptions. It is especially important that industry not begin to rely on SPR stocks as a substitute for prudent levels of their own inventories.

I would like to underscore that, Mr. Chairman. We find in some parts of the country, particularly in areas of New England, that stock levels are really quite disparate. Some States carry at any given time twice or three times the stock levels of other States. So, there is a question here that we will be addressing over time. Also, other methods to pay for the program are being considered.

ACQUISITION OF OIL FOR STORAGE

After examining several options for acquiring oil to fill the reserve, it has been determined that the crude oil to be stored should be obtained through the normal Federal procurement procedures. FEA will request offers from interested sellers. A revision of the crude oil entitlements program to permit a class of suppliers of oil to FEA to earn "entitlements" to price-controlled domestic oil as a result of delivering oil for storage is being considered in a proposed rulemaking.

The budget request submitted in January was based on this approach. This modification in the entitlements program would result in prices for the reserve oil near the national average composite price—imports included. It would reduce the cost of the program, as currently scheduled in the plan, to the Federal budget by about \$500 million while adding less than two-tenths of a cent to a gallon of petroleum products, until price controls expire. It may provide an equitable way for the petroleum industry and petroleum consumers to pay a proportionate share of the costs of the reserve which would directly benefit both the industry and petroleum consumers during an interruption.

We have concluded that it would be undesirable to take royalty oil for the reserve because of the disruptive effect it would have on

those small refiners now relying on that supply. It now appears that it would not be economical to use oil directly from the naval petroleum reserves because of the expected high market prices of that oil in the future, and because of logistical difficulties associated with using the oil.

Instead, it is expected to be preferable to sell that oil at market prices and to use resulting revenues to acquire other oil that is more suitable for the reserve. If changes in the availability or estimated costs of royalty oil or NPR oil make either of these sources attractive in the future, FEA will propose a revision to the plan to take advantage of these circumstances.

COST OF THE RESERVE PROGRAM

The cost of purchasing and transporting the crude oil will account for approximately 90 percent of the total 500 million barrel program which is expected to cost the Nation between \$7.5 and \$8 billion.

This cost estimate for crude oil assumes that all reserve oil, delivered by May 1979, including imports, will be obtained at the national average composite price. The average cost of construction and land acquisition for salt caverns and mines is estimated at between \$1.38 and \$1.65 per barrel and will occur primarily in the earlier phases of SPR development.

These costs are high, but storing oil in this reserve is much the same as buying an embargo insurance policy for America. I am totally convinced that we, as a nation, will find the premiums on this policy well worth the protection it offers.

The SPR plan now before the Congress was submitted in accordance with the statutory deadline of December 15, 1976. Thus, it was developed by the FEA during the previous administration and reflects the energy policies of that administration.

As you know, President Carter intends to develop comprehensive national energy policy recommendations and submit them to the Congress within the next 90 days. Such a policy framework, once developed, will allow the new administration to judge in a comprehensive fashion the appropriateness of specific energy actions, including the SPR program.

Thus, while the new administration generally supports approval of the current SPR plan now before the Congress, it will also be reviewing the specifics of the SPR program in the context of its own energy policies and will submit to the Congress such amendments to the plan as appear appropriate after this comprehensive review.

I will be pleased to answer any questions you may have. Thank you.

Mr. DINGELL. Mr. O'Leary, the committee thanks you for a very helpful statement.

Mr. Noel?

Mr. NOEL. Sir, I thought it might be helpful to the committee to review for you the status of the early storage program which, of course, is the initial component. I thought I might cover that briefly and then, of course, we will both be pleased to answer questions.

Mr. DINGELL. You will be recognized for that purpose.

Mr. NOEL. Eight candidate sites were selected for consideration for the initial portion of the program which is 150 million barrels by

December of 1978. I am happy to say that the site appraisals have been completed on all eight of those sites.

Environmental impact statements in final form will be complete by the end of this month on five of the sites. Environmental impact statements are already out for public comment on the remaining three. We have our architect-engineer on board. We will have a construction manager on board within a matter of a week, I believe.

We are presently working with the U.S. Army Corps of Engineers to acquire the water crossing and other permits that are required in the areas with which we will be dealing. We have dealt extensively with State and local authorities as well as Federal agencies such as the CEQ, EPA, and others in defending environmental aspects and in our effort to minimize the environmental impacts of the project.

I recently returned, as a matter of fact, this morning from Louisiana. We had meetings with the police juries in both Iberville and West Baton Rouge Parishes which are affected by one site. In the last 2 weeks we have had hearings at one other site in Louisiana. We are continuing that dialog.

We have appeared before the joint committee of the Louisiana Legislature. I might point out that at the police jury hearings the chairman of the Governor of Louisiana's environmental quality board made a statement indicating that the Governor's committee endorses the plan and is satisfied that the environmental provisions that have been made are adequate.

There also was testimony before those police juries with respect to air and water quality. We have been coordinating extensively with the private sector to determine what facilities are available, such as docks and terminal facilities in the area, so that we can minimize the cost of the program to the taxpayer. That is to say, we intend to lease to the maximum extent possible the facilities that are required.

So, basically there is an update, Mr. Chairman, as to where we are since we last appeared before you.

Mr. DINGELL. Mr. Noel, the committee thanks you for your comments.

Before the Chair recognizes his colleagues of the subcommittee for the purpose of asking questions, I would like to direct a question to either of you with regard to the submissions which have been made to the Congress by the administration.

I have certain questions as to whether those submissions properly satisfy the law or are properly before the Congress. Two events, I think, transpired which relate to this question. The first is, I understand, that was sent up at an earlier time with some kind of executive communication which generally said, "Here it is, fellows," but they did not indicate that it was exactly a formal submission to the Congress in the fashion which we are accustomed to receiving communications of this sort from the Executive. Incidentally, this was not submitted in this fashion by this administration, I am sure you are comforted to know.

Do you want to address yourself to the character of the submission, its validity, its compliance with the law, and the practical effect of the fashion in which the matter was submitted because it may create some problems in terms of the validity of the program and in terms of potential for liability and litigation on this matter?

Mr. O'LEARY. Mr. Chairman, we have had discussions between the staff of the several committees of the Congress and the staff of the FEA on this point. We are satisfied that we did not have an appropriate submission as of December 15. At some point today we are making a submission that we will regard as meeting all the legal requirement.

The clock will begin to run today. Our concern there, Mr. Chairman, is not so much with the substance as with the form. We were concerned less a subsequent legal action would find that the plan was, in fact, invalid and consequently we are moving now to cure that.

I want to point out to the chairman that this will not affect the timing of the actions that we will take under the plan.

Mr. DINGELL. I do not want you to take my comment too critically. I want to make sure that we get these matters in proper form so that they are not subsequently challenged by some kind of litigation which might delay the implementation of the program.

Mr. O'LEARY. That was precisely my concern, too, Mr. Chairman.

Mr. DINGELL. Can you inform the committee whether there are significant changes in the two different plans which will be submitted to the Congress?

Mr. O'LEARY. No, Mr. Chairman. We have reviewed the plan to the depth possible under the very short time that we have had to devote to it. It seems to us that in main outline it is appropriate. There are two or three areas, however, and happily procedural mechanisms, which will permit us to change should we find change is required in those two or three areas.

One has to do with the recurrent problem of the establishment of regional stocks. Another one I alluded to in my testimony and that has to do with the establishment of performance requirement on industry for industry stocks. The third has to do with the method of financing.

Mr. DINGELL. Mr. O'Leary, it would be immensely helpful if you would keep the staff of the subcommittee carefully advised on how these matters are progressing.

Mr. O'LEARY. Yes, sir.

Mr. DINGELL. Not because we wish to supervise you, but simply because we wish to cooperate with you. I think that this kind of action would be very useful in avoiding disharmony existing between the agency and the committee, which I am sure neither of us desires.

Mr. O'LEARY. Mr. Chairman, in that regard we have enjoyed, as I understand, the historically very close cooperation between the FEA staff and the staff of the subcommittee on this question. My instructions to the staff are to continue that very, very close association.

Mr. DINGELL. We would like that. I am sure it would be mutually beneficial.

Would it be useful for us to have in the record at this point the two submissions, the earlier submission of December 15 of their business as well as the most current submission?

Mr. O'LEARY. Yes, you will find the submissions are identical except for the cover letter. We will provide copies of the cover letter for your attention.

Mr. DINGELL. Without objection, those two documents will appear in the record at this point.

[Testimony resumes on p. 119.]

[The documents referred to follow:]

STRATEGIC PETROLEUM RESERVE PLAN
(ENERGY ACTION NO. 10)

COMMUNICATION

FROM

THE ADMINISTRATOR,
FEDERAL ENERGY ADMINISTRATION

RESUBMITTING

THE STRATEGIC PETROLEUM RESERVE PLAN (ENERGY ACTION NO. 10), TO CORRECT THE OMISSION OF AN ENERGY ACTION IDENTIFICATION NUMBER FROM THE ORIGINAL TRANSMITTAL



FEBRUARY 17, 1977.—Referred to the Committee on Interstate and Foreign Commerce and ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1977

LETTER OF TRANSMITTAL

FEDERAL ENERGY ADMINISTRATION,
OFFICE OF THE ADMINISTRATOR,
Washington, D.C., February 16, 1977.

HON. THOMAS P. O'NEILL, JR.,
Speaker of the House of Representatives,
Washington, D.C.

DEAR MR. SPEAKER: I hereby transmit to the Congress the Strategic Petroleum Reserve Plan of the Federal Energy Administration. This Plan, detailing the Administrator's proposals for designing, constructing, and filling the Strategic Petroleum Reserve, and furnishing other information about the Reserve, is submitted in accordance with the requirements of sections 154, 159 and 551 of the Energy Policy and Conservation Act, Public Law 94-163 (December 22, 1975), and bears energy action identification number 10. The Plan shall take effect following 45 days of continuous session of both Houses of Congress, unless approved or disapproved by Congress prior thereto.

This Strategic Petroleum Reserve Plan was developed during the previous Administration. I tend to review closely the provisions of the Plan, including the determination reflected therein not to establish a Regional Petroleum Reserve, as well as the FEA's proposal to utilize the Emergency Petroleum Allocation Act of 1973 to allow the Government to acquire crude oil for the Reserve at a price near the national average composite price to refiners.

However, I urge the Congress not to await the outcome of this review before permitting the Strategic Petroleum Reserve Plan to become effective. Our nation's growing dependence on oil imports makes it essential that this critical program proceed without delay. If it appears that revisions in the Plan are merited, I will not hesitate to propose appropriate amendments to the Congress.

The Strategic Petroleum Reserve Plan originally was transmitted to the Congress on December 14, 1976. By inadvertence, no energy action identification number was affixed to the Plan. Because this omission has created uncertainty as to the potential effectiveness of the Plan, I am today resubmitting it, bearing the prescribed identification number.

Sincerely yours,

JOHN F. O'LEARY,
Administrator.

94th Congress }
2d Session }

COMMITTEE PRINT

EARLY STORAGE RESERVE PLAN

(Public Law 94-163, Section 155)

PRINTED AT THE REQUEST OF

HENRY M. JACKSON, Chairman
COMMITTEE ON INTERIOR AND
INSULAR AFFAIRS
UNITED STATES SENATE

PURSUANT TO

S. Res. 45
THE NATIONAL FUELS AND ENERGY
POLICY STUDY

AND

HARLEY O. STAGGERS, Chairman
COMMITTEE ON INTERSTATE AND
FOREIGN COMMERCE
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NATIONAL FUELS AND ENERGY POLICY STUDY

(SENATE RESOLUTION 45, 92D CONGRESS)

This publication is printed for the use of Senators participating in the National Fuels and Energy Policy Study, authorized by Senate Resolution 45 of the 92d Congress.

Senate Resolution 45, introduced by Senators Jennings Randolph and Henry M. Jackson, was amended and agreed to by the Senate on May 3, 1971. The resolution authorized the Senate Committee on Interior and Insular Affairs and ex officio members of the Committees on Commerce and Public Works and the Joint Committee on Atomic Energy to make a comprehensive study of programs and policies required to meet national energy needs.

Subsequently, the Senate approved the addition of ex-officio members from the Committees on Aeronautical and Space Sciences, on Finance, on Foreign Relations, on Government Operations, and on Labor and Public Welfare.

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(III)

MEMORANDUM OF THE CHAIRMAN

To Members and Ex-Officio Members of the Senate Committee on Interior and Insular Affairs National Fuels and Energy Policy Study, Pursuant to Senate Resolution 45 (92d Congress) and the House Committee on Interstate and Foreign Commerce:

The Energy Policy and Conservation Act passed by the 94th Congress provided for the creation of a Strategic Petroleum Reserve of up to 1 billion barrels of crude oil and petroleum products.

The purpose of establishing the Reserve is not only to minimize the impact of curtailed oil imports but also to deter the use of such curtailments as political weapons in the future.

As part of the Strategic Petroleum Reserve, Congress required the establishment of an Early Storage Reserve containing not less than 150 million barrels of crude oil and petroleum products within 3 years of the date of the enactment of the Energy Policy and Conservation Act, December 22, 1975. The Act required the Administrator of the Federal Energy Administration to submit an Early Storage Reserve Plan within 90 days of enactment detailing his proposals for implementing the Early Storage Reserve requirements. The Plan was finally submitted to Congress on April 22, 1976.

The Energy Storage Reserve Plan will be followed by the overall Strategic Petroleum Reserve Plan, which must be transmitted to Congress not later than December 15, 1976. Unlike the overall Plan, which does not take effect unless neither House of Congress has disapproved it, the Early Storage Reserve Plan can be implemented immediately.

There is general agreement that the volume of oil imports will continue to grow in the next 10 years. As a share of demand, such imports are unlikely to drop below 40 percent and could go as high as 50 percent. Given this degree of dependence on imports, the need to create an effective Strategic Petroleum Reserve is greater than ever. The Early Storage Reserve Plan represents an important first step toward that objective.

HENRY M. JACKSON,

Chairman, Senate Committee on Interior and Insular Affairs.

HARLEY O. STAGGERS,

Chairman, House Interstate and Foreign Commerce Committee.

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I. INTRODUCTION

The Early Storage Reserve (ESR) Plan has been prepared by the Federal Energy Administration (FEA) in accordance with Section 155 of the Energy Policy and Conservation Act (the "Act"). To place that plan, which constitutes the remainder of this document, in perspective, this introductory section identifies the events leading to the creation of the ESR and summarizes the enabling legislation.

BACKGROUND

The petroleum production cutbacks, higher prices and embargo imposed during the winter of 1973-1974 provided dramatic evidence that the United States and oil consuming countries are vulnerable to interruptions in imports from the major oil-exporting nations. The embargo was characterized by: (1) a substantial reduction in oil imports, estimated at approximately 2 million barrels per day for 19 weeks, and in the various products of this oil, (2) a drastic increase in the price of imported oil; and (3) its occurrence during a period of increased demand for petroleum products.

Although the economic impacts of these events on the U.S. are still under study and debate, most of the macro-economic study estimates of the repercussions of supply denial and simultaneous price increases tend to indicate a Gross National Product (GNP) loss of approximately \$35-\$45 billion. Although not all of this GNP loss can be ascribed to the embargo (perhaps \$10 to \$20 billion can be) there is no doubt that it contributed significantly to increases in the consumer and wholesale price indices. In addition, the GNP loss was reflected in higher unemployment and stagnation in several sectors, including automobile sales and housing starts, which exacerbated the economic downturn believed to have started in late 1973. During this period, the supply cutbacks prevented real growth that probably would have stabilized unemployment and provided a stronger base for eventual economic recovery.

It is questionable whether this exact set of circumstances will occur again, since production of exporting countries has already been substantially cut back. There is at least temporarily an excess of supply at existing prices, major new sources (North Sea, North Slope) are about to come on stream and exporters are becoming increasingly dependent on the economic prosperity in importing countries. Nevertheless, it is possible that future supply interruptions

could be longer and even more severe than the 1973-1974 Arab oil embargo. Moreover, there is reason to believe that a new supply interruption would have more severe impacts on GNP and employment because the economy would be less able than it was in 1973 to adjust to a sharp drop in the supply of petroleum. Specifically, the Nation may be less able to adjust to energy shortages because higher energy prices, natural gas shortfalls, and continued uncertainty about the availability and prices of alternative forms of energy have induced many energy users to restrict their energy consumption and emphasize more effective energy management practices. As a result, many relatively easy steps to conserve energy have already been taken and significant improvements in energy efficiency have been achieved. Further improvements will require investment, long lead times, and even more intensive energy management. The program to convert oil- and gas-fired utilities and industrial plants to coal under the Energy Supply and Environmental Conservation Act of 1974 (as amended by the Act) will have converted many plants to coal, which will largely preclude conversion to coal during an embargo.

To lessen the Nation's vulnerability to petroleum supply interruptions, the development of a strategic petroleum reserve has been recommended by a number of groups, including the National Petroleum Council (NPC), Ford Foundation, the Energy Laboratory at the Massachusetts Institute of Technology (MIT), and the Research and Policy Committee of the Committee for Economic Development. In addition, such a reserve will be helpful to the United States in the context of the International Energy Program (IEP) agreement, which has been entered into by the United States and 17 other energy-importing countries.

The establishment of a strategic petroleum reserve would contribute to international stability by: (a) serving to deter future supply interruptions, since the target nations will have available a quick response capability that will increase the potential costs and reduce the benefits to the nations responsible for the shortages; (b) providing additional evidence that the United States is capable of meeting its IEP commitments without depleting its petroleum inventories; (c) avoiding the adverse economic consequences of a severe supply interruption, regardless of the cause, in the United States; and (d) avoiding undue pressures on United States foreign policy.

LEGISLATIVE DIRECTIVES

The concern voiced by these organizations and by the public, in addition to the Nation's formal commitments to the IEP, provided strong impetus for an emergency storage program. A number of bills providing for a strategic petroleum reserve were introduced in the 93rd Congress. President Ford recommended a storage program in his State of the Union message in January 1975, and Titles I and II of the Administration's Energy Independence Act provided for the creation of such a reserve. Thereafter, the Senate and the House of Representatives passed separate bills (S. 622 and H.R. 7014, respectively) requiring or authorizing creation of a strategic storage reserve, which ultimately were enacted as Title I, Part B, Sections 151 through 166, of the Energy Policy and Conservation Act (P.L. 94-163).

Briefly, the Act provides for the creation of four distinct but interrelated reserve programs:

- o Strategic Petroleum Reserve (SPR)--Sections 151 and 154. To reduce the impact of disruptions in supplies of petroleum products,¹ or to carry out U.S. obligations under the IEP--the Act requires storage of at least 150 million barrels of petroleum products, including crude oil, by December 22, 1978, and authorizes the storage of up to 1 billion barrels. The Act requires FEA to develop a national plan for crude oil storage which must provide for, to the maximum extent practicable, the storage of crude oil equal to the volume of crude oil imported into the United States during the 3 consecutive highest import months in the 24 months preceding December 22, 1975, (subsequently determined to be approximately 500 million barrels, which were imported during October-December, 1975), by December 22, 1982. The Act establishes interim targets of 10 percent of this goal within 18 months of enactment; 25 percent within 36 months; and 65 percent within 60 months.

¹petroleum products, as defined in the legislation, means crude oil, residual fuel oil, or any refined petroleum product (including any natural gas liquid) and any natural gas liquid product. The statutory definitions are used throughout the report. (See Appendix A for a copy of the legislation.)

- o Early Storage Reserve (ESR)--Sections 151 and 155. The Act further requires creation of an ESR as part of the SPR to provide limited protection from near-term disruptions in the supply of petroleum products, and to fulfill U.S. obligations to the IEP. To this end, if the SPR Plan has not become effective, the ESR must contain at least 150 million barrels of petroleum products to be stored, to the maximum extent practicable, in existing capacity by December 22, 1978. The ESR must also provide for meeting needs for residual fuel oil and refined petroleum products in regions of the country that depend on petroleum imports to fill a substantial portion of their total energy requirements.
- o Industrial Petroleum Reserve (IPR)--Section 156. The Act grants the FEA discretionary authority to establish an IPR to implement the ESR or the SPR. Specifically, the Act authorizes the FEA to require importers and refiners to acquire, store, and maintain in readily available inventories amounts of petroleum equal to 3 percent of the amount imported or refined by them in the previous calendar year. According to available data that is estimated to be 185 million barrels.
- o Regional Petroleum Reserve (RPR)--Section 157. The SPR Plan must provide for the establishment of an RPR in, or readily accessible to, any FEA region in which imports were used to meet more than 20 percent of residual fuel oil or refined product demand during the preceding 24 months. The quantity of petroleum product in the RPR is part of, rather than in addition to, the quantities of crude required in the SPR. Although the RPR is designed to provide substantial protection against regional supply interruption, it is not to exceed the aggregate of imports of the highest 3 consecutive months of the preceding 24-month period, computed annually. The FEA may substitute crude or product for amounts of residual fuel oil or other refined petroleum products stored in the RPR, if substitution is necessary or desirable for purposes of economy or efficiency and if there will be no delay or other adverse effect on satisfying the purposes of the RPR.

Section 153 of the Act established within FEA a Strategic Petroleum Reserve Office (SPRO). This office succeeds the Oil Storage Task Force created in the spring of 1975, and will implement

the Act through the efforts of its five divisions--Storage Assessment, Management and Operations, Regulations and Coordinations, Industrial and Regional Programs, and Facility Program Management.

As a first step in fulfilling its responsibilities, the SPRO has prepared the ESR Plan for submission to Congress. In Chapter II this Plan is summarized for rapid comprehension and ready reference. The remainder of the report expands the summary, explaining in detail how the reserve will be created; what methods will be used to monitor, control, and use it; and what foreseeable impacts the creation, maintenance, and use of the ESR will have on the environment and on the economy.

II. EARLY STORAGE RESERVE SUMMARY

The objective of the ESR is to store 150 million barrels of crude oil by December 1978. This storage requirement will be incorporated into the SPR after the SPR Plan becomes effective. Thus, the 150 million barrels of the ESR is the first increment of the SPR required by the Act.

Additionally, the Act authorizes the creation of the Industrial Petroleum Reserve as part of the SPR. Under this provision, the FEA could require importers and refiners to acquire, store, and maintain petroleum reserves. However, no decision on whether or not to implement the IPR has been made. A thorough analysis is being conducted and the views of industry, consumers, and others on this issue will be solicited. The maximum IPR amount authorized by the Act is three percent of the amount imported or refined in the previous year, which would currently amount to approximately 185 million barrels.

Further, the Act requires that the ESR shall provide for meeting residual fuel and refined product needs in any region that the FEA Administrator determines is or is likely to become dependent on imports for a substantial portion of its total energy requirements. FEA interprets this mandate to be substantially similar to the RPR portion of the SPR, which requires that product or crude be stored in, or readily accessible to, the particular regions affected. The analysis on regional storage is in process, and a determination will be made by December 1976 as to whether crude or product will be stored in the RPR, and whether it will be in or readily accessible to the affected regions.

The ESR has been designed to meet to the extent practicable all stipulated and implied storage requirements within the deadlines specified in the Act. (See Figure II-1.) As noted below, this will require a significant implementation effort. To demonstrate the feasibility of such a plan, the remainder of this chapter summarizes current plans on: (1) how the ESR will be developed; (2) how it will be managed under normal conditions and in the case of an energy supply interruption; and (3) what the environmental and economic impacts of the ESR are likely to be.

DEVELOPMENT OF RESERVE

Development of the reserve involves answering a number of questions and resolving several issues concerning the petroleum products to be stored and the physical facilities in which they will be maintained.

Petroleum Products for Storage

The questions to be answered for storage products include how much and what kind of petroleum (i.e., crude oil and refined products) should be stored, and the way in which those quantities should be acquired, including the rate at which they will have to be acquired to meet the mandated deadlines.

The ESR must be capable of supplying different types of crude in quantities required to meet various market demands. The types of crude selected for storage will be compatible with the crude requirements of those refineries that are likely to be cut off during a supply interruption i.e., the crude will conform to the refineries' processing capabilities in terms of its characteristics (e.g., molecular composition, wax and asphalt content and API gravity).

On this basis, nine possible crude oil segregation categories were identified, using crude oil sulfur content and API gravity as the important defining characteristics. (Residual metals content will be included at a later date). With this preliminary classification scheme, the amount of each type of crude which may be stored in the ESR was calculated; the results are displayed in Table II-1. This is a target mix; precise combinations of crude will be decided subsequently as determined by considerations of cost and the needs of the refineries for which crude is stored.

Table II-1

ESR Storage Volumes by Type of Crude

Segregation Category		Target Mix (Percent)	ESR (MMB)
Sulfur Wt. %	API °		
0.01-0.50	43 - 47	6.6	9.9
0.01-0.50	38 - 40	8.2	12.3
0.51-1.00	38 - 40	1.9	2.8
1.01-1.80	38 - 40	1.5	2.2
0.01-0.50	33 - 37	16.6	24.9
1.01-1.80	33 - 37	35.8	53.7
0.01-0.50	29 - 32	2.7	4.1
0.51-1.00	29 - 32	3.9	5.9
1.01-1.80	29 - 32	22.4	33.7
TOTALS		100.0	150.0

The FEA plans to acquire the petroleum products for the ESR from crude oil obtained through purchase on the open market, at a price equivalent to the national average price.

The President has submitted a budget request for FY 1976 and FY 1977 to implement the ESR. To meet the storage objective, purchase and construction of all ESR storage facilities must occur in late FY 1976 and early FY 1977. To meet the total storage objective of the SPR, new construction of SPR facilities should be initiated in early FY 1978. Consequently, FEA has requested obligation authority of \$300 million in FY 1976 for the construction of all facilities for the ESR and \$550 million in FY 1977 for the purchase of 50 million barrels of oil (See Table II-3).

To meet the 1978 deadline stipulated in the Act, FEA has planned a stringent storage schedule, as shown in Table II-2.¹ FEA plans to begin filling the storage facilities early in 1977 and to have 150 million barrels stored by the end of 1978. However, the actual timing of purchases is contingent upon whether the storage facilities will be ready and the availability of funds.

The proposed schedule is further predicated on the assumption that the requirements of the National Environmental Policy Act (NEPA) can be satisfied without procedural delays and that all necessary State, local and Federal permits can be obtained on schedule. Presently, programmatic and multiple site specific environmental impact statements are being prepared, with initial drafts scheduled for release during May of this year. Identification of permit requirements is also proceeding and a schedule of filings will be prepared.

¹ It is infeasible to acquire and fill 50 million barrels of economical storage facilities, the 18-month target for the Strategic Petroleum Reserve, by June 1977. Little existing capacity is available, and leasing costs would be excessive compared with conversion of salt domes. Conversion and filling of 50 million barrels capacity cannot be completed by June 1977.

To commence filling the reserve in early 1977, it will be necessary to initiate purchases for oil in early FY 1977 and to continue purchasing oil until the SPR is complete.

Table II-2

ESR Storage Schedule

<u>Time Period</u>	<u>Volumes to Enter Storage</u> (Millions of barrels)	
	<u>Incremental</u>	<u>Cumulative</u>
January - December 1977	60	60
January - December 1978	90	150

Storage Facilities

In compliance with the Act, FEA will, to the maximum extent practicable, use existing storage capacity for the ESR, and this will be incorporated into the SPR after the SPR Plan is approved. The major storage facility options available are salt domes, mines, and tanks. Given the 3-year timeframe of the ESR, existing and convertible mines and salt dome caverns will be the principal storage facilities for the ESR. However, if sufficient existing capacity is not attainable, newly constructed salt dome caverns, using a "fill while leaching" technique, will be used. Initial assessments indicate that tank storage will not be needed.

At present, it is estimated that existing salt caverns¹ have a capacity in excess of 200 million barrels, 127 million barrels of which could be converted and filled by December 1978. Existing underground mines² have an estimated capacity of 170 million barrels, of which 75 million barrels could be converted and filled within the next three years.

¹ Caverns/cavities throughout this report refer to storage volumes created by solution mining techniques. The existing caverns/cavities must be connected to petroleum pipelines before they can serve as storage facilities.

² Mines throughout this report refer to storage volumes created through conventional dry-mining techniques.

To comply with the directives of the Act--to use existing facilities to meet the 3-year ESR requirement for 150 million barrels--and to incorporate ESR sites into the SPR, as well as to realize the usual economies of scale, the FEA will acquire for the ESR facilities with an ultimate capacity of 200 to 300 million barrels.¹ A mine or cavern used to store ESR requirements can then satisfy at least part of the SPR requirements by filling the cavities to their full converted capacity.

Although specific sites have not as yet been selected, optimum general locations have been identified. They are: (1) salt domes in the Gulf Coast; and (2) mines located in the South and Midwest. Specific sites will be chosen on the basis of:

- o Short-term (i.e., 3-year) and ultimate capacity
- o Accessibility to distribution system
- o Freedom from technical restrictions
- o Extent of environmental impacts
- o Feasibility of acquisition
- o Costs.

Priority will be placed on sites that would (1) minimize the cost of the reserve, (2) be able to efficiently deliver oil at rates required to refiners and users of imports during an oil interruption, (3) be included in the final Strategic Petroleum Reserve because of their desirable location and cost, and (4) have the potential for being filled, at least in part, in three years.

Facilities for the ESR will be acquired primarily through site-by-site negotiation. Design and engineering work and early procurement of strategic materials will begin soon.

MANAGEMENT OF THE ESR

The ESR will be managed through an interconnected system of controls, regulations, and withdrawal and allocation procedures.

To ensure the integrity of the purchase, transport, storage, and distribution of crude oil and refined products in the ESR, FEA will establish and maintain financial audit controls, purchasing and receiving controls, site

¹ Lead-time considerations limit the possible amount of actual fill within the 3-year timeframe to slightly in excess of 150 million barrels even though the final capacity is greater.

security and storage monitoring, an independent inspection and auditing system, and withdrawal controls. In addition, FEA will issue and enforce regulations regarding the method of drawdown and the way in which the petroleum would be allocated in the event of a supply disruption.¹

The rate at which crude oil will be withdrawn, and distributed, will vary with the nature of the supply interruption and the size of the reserve. It will be based on the amount of petroleum in the reserve and the estimated length of time it must last (i.e., the projected length of the supply interruption), the estimated size of the supply shortfall in relation to U.S. consumption, and the implementation of other contingency plans, including the Energy Conservation Contingency Plan or the Rationing Contingency Plan.²

The storage facilities and all related facilities, which include pipelines, surge tanks, terminal facilities, and associated port facilities, will be integrated with existing crude oil distribution systems and will be adequate to meet fill and disbursal rates. During a severe shortage, petroleum will be transported to those areas requiring supplies, using the existing transportation facilities. Tankers and barges could be used to transport crude oil to the East Coast, Caribbean, and Gulf of Mexico refineries. In the event of severe interruption, idle foreign flag ships might be used, although this would require a waiver of the Jones Act provision which generally precludes the use of foreign flag ships for transportation from one U.S. port to another.

IMPACTS OF THE ESR

Development and use of the ESR may have a number of important environmental and economic impacts. The FEA is conducting comprehensive environmental studies now to

¹ The authority to activate the drawdown of the ESR, however, rests with the President. Such an order would be based on recognition of a severe petroleum supply interruption or an obligation of the United States under the International Energy Program.

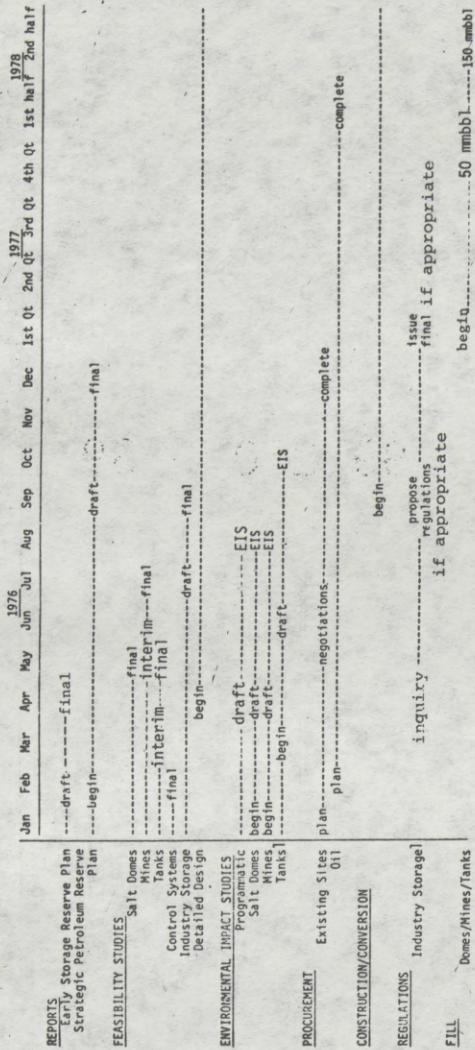
² Pursuant to Section 201 of the Act, these contingency plans are being developed and will be submitted to Congress by the President in June 1976.

determine the environmental impacts from the ESR. A draft programmatic environmental impact statement will be made available to the public in May 1976.

In addition to the programmatic environmental impact statement, FEA is preparing environmental impact statements on potential sites under study. Results of these site-specific studies will be used both in site selection and, subsequently, in facilities design.

The impacts of creating the ESR on the nation's GNP, employment and inflation are projected to be negligible. Further, it is the FEA's assessment that the crude oil purchase schedule (see Table II-2) will not materially affect world petroleum markets. However, the ESR will result in the transfer of approximately \$2 billion additional to foreign countries by December 1978.

Figure II-1
EARLY STORAGE RESERVE
Major Milestone



Schedule for Planning Purposes only.

Table II-3

STRATEGIC PETROLEUM RESERVE FEDERAL BUDGET OBLIGATIONS

	FY 76	1Q	FY 77
<u>Petroleum Products and Facilities</u>			
◦ Fed. Gov't. Open Market Purchase (MMb)	-		50
◦ Government Oil Purchases	-		550,000
◦ Facility Design/Purchase Construction	300,000		-
Planning/Operations/Personnel (\$000)	13,566	600	7,684
<u>TOTAL (\$000)</u>	<u>313,566</u>	<u>600</u>	<u>557,684</u>

III. DEVELOPING THE RESERVE: PETROLEUM PRODUCTS

The purpose of the ESR is to develop quickly (over a 3-year period) at least a 150-million-barrel reserve of petroleum products to provide short-term protection against a possible supply interruption. In the case of a severe interruption, the ESR would cushion the adjustment of the economy to lower levels of petroleum supplies while minimizing the immediate extent of any potential loss in GNP. The establishment of the ESR should also help to discourage oil-exporting countries from initiating an embargo.

Given these important benefits, the FEA is moving ahead quickly in developing the reserve. This development involves the establishment of quantitative answers to a number of questions about the types and quantities of refined products and crude oil needed, and the way in which those quantities can be acquired. Moreover, since the development of the ESR must be consistent with the development of the longer term SPR, particular care has been taken to evaluate the extent to which such consistency exists.

QUANTITIES AND TYPES REQUIRED

As specified in the Act, the ESR will contain not less than 150 million barrels of petroleum products by the end of 1978. Although the legislation does not stipulate the amount or portions of this total that must be crude and refined products, it does indicate that regional needs for residual fuel oil and refined products must be provided for in those areas that, in FEA's judgment, depend heavily on imported oil or refined products or are likely to become dependent on imports for a substantial portion of their total energy requirements. Any refined products stored are to be a part of, rather than an addition to, the total size of the ESR.

For the SPR, the Act stipulates a minimum quantity which must be in storage by December 1982 unless FEA proposes, and the Congress accepts, a modified quantity. This minimum storage must equal the amount of crude oil imported into the United States during the 3 consecutive months of the 24-month period preceding December 1975¹ in which average

¹ The date of the enactment of the Act.

monthly imports were the highest. A general maximum of 1 billion barrels is also authorized in the Act. Given the 3-month peak level of imports that occurred in October-December 1975, the minimum requirement will be approximately 500 million barrels. (See Figure III-1).

In addition to setting target and maximum requirements for the reserves, the Act provides a mechanism for allowing FEA to recommend changes in the specified volumes and target dates. FEA may develop such a recommendation, based on a detailed cost/benefit analysis and other relevant factors for inclusion in the SPR plan to be submitted to Congress by December 15, 1976.

Although the Act does not stipulate the amount or percentage of the total petroleum storage requirement that must be crude oil or refined product, both the ESR and the SPR are to provide a combination of refined products and crude that would be responsive to market needs during a supply interruption.¹ The relative quantities and types of refined products and crude oil that should be stored at any time are a function of: (a) the quantity and types of refined product and crude oil being imported from potentially interruptible sources; (b) relative dependency of various regions on those imports; (c) available refinery capacity and yield flexibility here and abroad; (d) potential demand restraints; (e) capabilities of the petroleum distribution system; and (f) relative acquisition costs.

All evidence indicates that historical trade patterns are poor indications of trade patterns during a major supply interruption. However, in attempting to determine how much product and crude must be stored, the FEA disaggregated the U.S. petroleum market into regional markets. For refined

¹ The components of the marketplace--refineries and petroleum product consumers--would be affected by any embargo to different extents, according to their degree of dependence on interrupted petroleum. Moreover, refineries and petroleum-product consumers are capable of responding to petroleum shortfalls to different extents. For example, refineries can alter their capacity utilization rates and yields, subject to costs and technical limitations. Consumers can change their consumption patterns to achieve conservation.

products, historical and projected consumption were examined in all FEA Administrative Regions. (See Figure III-2 for a list of these regions.) Because marketing patterns of crude oil are different from those of products, 14 crude markets, based on major refinery groupings and shared access to similar distribution facilities, were identified to study historic and projected crude oil consumption. (See Figure III-3, for a list of the crude oil markets, and Figure III-4, for a map of these markets.)

Refined Products

The Act requires that "the ESR shall provide for meeting regional needs for residual fuel oil and refined petroleum products in any region which the Administrator determines is, or is likely to become, dependent upon imports of such oil or products for a substantial portion of the total energy requirements of such region." In planning the most effective and economical means of providing for these needs, FEA has identified preliminary guidelines relating to quantities, locations, and substitution of crude for products:

1. The RPR is not to exceed the imports of qualifying products in the highest 3 consecutive months out of 24 months preceding an annual recomputation for each region. FEA has prorated this maximum for the ESR as 30 percent of the RPR maximum for the SPR.
2. A portion of the reserve is to be established in, or be readily accessible to, each FEA region with imports of refined or residual petroleum products in excess of 20 percent of the demand for these products.¹
3. The reserve is to contain sufficient amounts of refined products or substitute crude, as provided in the Act, to protect the regions against an interruption or reduction in residual-oil or refined-product supplies.

¹ FEA considers it a general requirement of the program that reasonable assurance be provided for the availability of any imported products that may constitute less than 20 percent of consumption.

4. Crude oil, residual fuel oil, or any refined petroleum product may be substituted for all or part of the residual fuel oil or refined petroleum product required for any region, if such substitution is necessary or desirable for purposes of economy, efficiency, or other reasons, and if such substitution can be made without delaying or otherwise adversely affecting fulfilling RPR requirements.

To determine which FEA regions depended on imports for 20 percent or more of their total demand, 1973 and 1974 consumption data were collected from the Bureau of Mines' (BOM) Fuel Oil Sales Annual, and import data were obtained from the U.S. Department of the Interior's (DOI) oil and gas imports data base and the BOM's Annual Petroleum Statement.¹ To establish regional-import levels, DOI regional import proportions were applied to BOM data because BOM data are unavailable on a regional basis. RPR requirements were then calculated by comparing these import figures with consumption data from BOM's Sales of Fuel Oils and Kerosine.² (See Figure III-5.)

From this comparison it has been determined that product imports in 1973-1974 exceeded 20 percent of regional demand for distillate fuel oil in FEA Regions 1 and 2 and for residual fuel oil in FEA Regions 1, 2, 3, and 4. (See Figure III-6.) Current FEA Project Independence Evaluation System (PIES) forecasts indicate an RPR will probably not be required in future years for some of the presently qualifying regions and products because residual oil and distillate imports into Region 1 through 4 are projected to decrease from an average daily rate of 1.6 million barrels in 1973-1974 to 1.3 million barrels in 1980 and 500,000 barrels in 1985. (See Figure III-7 for PIES regional product forecasts for FEA Regions 1-4 in 1980 and 1985.)³

¹ Two sources of import statistics were used because irreconcilable differences were discovered when the two sets of data were compared.

² Sales of Fuel Oils and Kerosine, Bureau of Mines, 1974.

³ The PIES regional product forecasts assumed no transportation constraints between regions, particularly on the West Coast and from Alaska eastward to the central United States.

To determine the advisability of substituting crude oil, residual fuel oil, or any refined petroleum product for all or part of the residual fuel oil or refined petroleum product required for any region, the FEA has initiated a comprehensive study of site availability, costs,¹ refinery capacities and yield flexibility, transportation, and distribution alternatives. Early results indicate it may be possible to substitute crude completely for product in the RPR; however, because the analyses are incomplete, these early conclusions may be invalid.² Moreover, preliminary findings indicate there are only two viable means of storage for the RPR: aboveground storage primarily in steel tanks located in the affected FEA regions, and underground (i.e., caverns, mines) storage in the Gulf of Mexico. The startup time for development of steel tanks is very rapid--about one year. On the other hand, since the bulk of the SPR crude will be stored in salt domes in the Gulf, and since work has already begun to develop these storage facilities, it would be relatively simple to include storage of RPR substitution crude in these plans at a later date.

Because the analyses have not been completed and no final conclusions on the advisability of crude substitution for product have been reached, the final decision on the RPR substitution issue has been deferred until the SPR plan is prepared and submitted to Congress in December 1976.

This period will allow the FEA sufficient time to analyze the myriad details that affect the feasibility of a total substitution of crude for product in the RPR. Moreover, because of the relatively rapid start-up potential inherent in above-ground storage, any program risks associated with deferring final decision until the December 1976 SPR report to Congress would be minimal. Plans for underground storage of crude oil in the Gulf of Mexico area must proceed whether or not crude is substituted for product.

¹ The storage of residual oil would require heated tanks for above-ground storage or an underground heating system for below-ground storage. This requirement makes the cost of storing residual oil 5-15 times higher than the cost of storing crude oil in salt domes. As an alternative, No. 4 oil could be stored in salt domes or distillate could be blended with residual oil, but the Btu value of distillate is about 7 percent less than residual, and its price (in November 1975) was about 18 percent higher per barrel.

² Final analytical results will be presented in the December 1976 SPR report to Congress.

Thus, the FEA has, for ESR planning and budgeting purposes, included in this report requirements for storage of crude oil only in the Gulf of Mexico area. Any changes in this approach will be incorporated in the SPR plan.

Crude Oil

Although the final decision on crude substitution has been deferred until December 1976, for planning purposes the FEA has assumed the ESR will consist of 150 million barrels of crude oil. However, crude oil is not a homogeneous commodity, with some characteristics such as sulfur content and gravity¹ varying significantly. For example, crude from Algeria tends to have a high API gravity² and few impurities such as sulfur. In contrast, Saudi Arabian crudes tend to be heavy (i.e., a low API gravity) and have a high sulfur content.

Gravity and sulfur content have marked effects on refinery processing equipment and product yields.³ Specifically, refineries that process crude oils with high sulfur content require expensive desulfurization equipment. In addition, crude oil with high API gravities tend to yield greater amounts of light ends, such as light naphtha and diesel fuel, than heavy crudes. For example, a Texas Gulf Coast heavy crude will yield 5 percent by volume light naphtha and 12 percent by volume heavy fuel oil. On the other hand, Texas Gulf Coast light crude will yield 13 percent by volume light naphtha and only 1 percent by volume heavy fuel

¹ Analysis of other crude characteristics, such as residual metals content, will be included in a study at a later date.

² Gravity is measured in American Petroleum Institute (API) degrees; the higher the API degree, the lighter the crude oil. Sulfur content is measured by weight percent; the higher the weight percent, the higher the sulfur content.

³ Although sulfur content is of some significance--e.g., highly corrosive feedstocks can be limited to refineries with this processing capability--moderate corrosion has been encountered with some crudes containing as little as 0.2 percent sulfur, while some higher sulfur crudes (0.4 to 0.9 percent) cause only mild corrosion. Hence, a more selective measure may be needed.

oil.¹ Because of these differences in crude and their potential impacts on end products, the 150-million-barrel ESR and 500-million-barrel SPR² crude requirements were broken down by assay characteristics.³

The amount of each type of crude to be stored depends on its compatability with processing equipment at refineries at which import shortfalls would be expected to occur, and with product mix objectives. For the purpose of preliminary planning of crude oil purchases, a crude oil classification system, based on API gravity and sulfur-weight percent, has been developed.⁴ In this system, there are 8 sulfur and 12 gravity categories. (See Figure III-8.) Again, for the purposes of preliminary planning only and given time constraints in preparing this report, the total amount of non-Western Hemisphere crude oil imported during 1974 i.e., an average of 2.06 million barrels per day - was distributed throughout the matrix on the basis of sulfur content and API gravity,⁵ and percentages of total were calculated. (See Figure III-9.) The effects of a possible interruption of Western Hemisphere imports will be examined in the future.

¹ The difference in yields can be even more striking, as is the case with Latin American crudes from Leona and Oficina. Oficina crude has a gravity of 36.3 API and a yield by volume of 32.5 percent and 11.1 percent for residual and asphalt, respectively. Leona crude, at 25.1 API, yields 54.5 percent and 33 percent, respectively, of residual and asphalt.

² Pending resolution of the RPR crude substitution option.

³ Using only sulfur content and API gravity to determine the quantities of crude types to be stored may not be sufficient, and other characteristics (e.g., viscosity, pour point) may be included at a later date.

⁴ The FEA is in the process of performing an analysis of residual metals, including nickel and vanadium. The results of this analysis will be integrated into the gravity/sulfur weight classification scheme.

⁵ These quantities by type should be interpreted as "acceptable to" rather than "needed by" refiners at that time. The extent to which price influences a buy decision has not been determined. Crude quantities by type, based on actual refinery need, is the subject of continuing FEA study.

Assuming these percentages of total will remain relatively constant, the target amounts of each type of crude required for the ESR (See Figure III-10.) and the SPR (See Figure III-11.) were calculated. The necessary level of each type of crude could be achieved either by placing that type of crude in storage or by blending at individual refineries. However, amounts of each type of crude actually purchased and stored could differ from these targets because of crude oil availability and/or price, limitations in site design, refinery adaptability to varying crude types, changes in domestic refinery yield desired during an emergency, or changes in the composition of imports of non-Western Hemisphere crude over time.

The impact of each of these factors on the composition of the ESR and the SPR is currently being analyzed. However, initial findings indicate that the amount of crude oil actually stored will be severely constrained by site design considerations. As a result, the ESR and the SPR will probably contain only 4-10 grades of crude oil.

The quantity of each crude type for the ESR and the SPR (see Figures III-10 and III-11.) was based on the amount of non-Western Hemisphere crude oil imported into the U.S. and the Caribbean during 1974 and, consequently, includes a significant amount of high-sulfur crude that was refined in Caribbean refineries. However, United States refineries, in general, cannot process crudes with the higher sulfur levels to the same extent as Caribbean refineries. Therefore, the amounts of high-sulfur crudes were shifted toward the lower-sulfur-weight categories by a weighting scheme that reflected U.S. refining capabilities.¹

In addition, the number of crude types originally identified and calculated was excessive and had to be reduced for further analysis. To this end, the various categories of crude were clustered to determine where the greatest demand, by type, existed. This clustering and the redistribution of high-sulfur crudes resulted in nine crude categories composed of the ESR and the SPR quantities shown in Figure III-12. Analyses indicate that future crude oil imports will tend to be higher in sulfur content and have

¹ U.S. Domestic Petroleum Refining Industry's Capability to Process Sweet/Sour Crude Oil, National Petroleum Refiners Association, May 17, 1973.

lower API.¹ This contingency will be accommodated in two ways. First, the composition of non-Western Hemisphere crude imports will be continually monitored; as the composition changes, the types of crudes acquired will change. Second, refineries can typically process lower-sulfur-content crudes than they are currently using. Therefore, even if interrupted crudes were to have higher-sulfur-content than those in the reserve, it is anticipated that the reserve petroleum could be used without loss of product yield.

ACQUISITION

In addition to specifying the types and quantities of petroleum products to be included in the ESR, it is important to identify how this oil will be acquired. The following sections describe how the acquisition will be financed, how much it will cost, where it will be obtained, and at what rate it will be acquired.

Financing

The Act authorizes FEA to acquire petroleum products in a manner consistent with the following objectives:

1. Minimization of the cost of the reserve
2. Orderly development of the NPRs to the extent authorized by law
3. Minimization of the nation's vulnerability to a severe energy supply interruption
4. Minimization of the impact of such acquisition on supply levels and market forces
5. Encouragement of competition in the domestic petroleum industry

The Act authorizes the FEA Administrator to require refiners and importers to provide an Industrial Petroleum Reserve (IPR) of up to 3 percent of the amount refined or imported (refinery throughput or imports) in the previous year. Although this option is under study, a final decision cannot be made on the advisability of exercising this authority until further information is gathered and analyzed.

¹ Based on marginal world supply, the U.S. can expect to import more crude from Saudi Arabia since it has the largest reserves. This crude is primarily high in sulfur content and low in API⁰.

FEA initiated a major study in December 1975 to determine what would be involved in implementing an IPR and what regulations should be established. The options for implementation range from requiring every importer and refiner to stockpile the required quantities in storage facilities of his own choosing in close proximity to his distribution system, to having the government provide large, central storage locations such as salt domes and allowing industry to rent these government-provided storage facilities to store IPR oil. Between these extremes are many combination options--e.g., consortia and third parties providing storage facilities. Each option would have significantly different regulatory requirements, environmental and antitrust implications, monitoring and enforcement requirements, and cost to industry and to the consumer. Thus, the costs and benefits of the IPR may be different for each option.

The study will also assess the effect of regulations on economic viability and competitiveness within the petroleum industry. At the conclusion of this study, the FEA will adopt a position on the advisability of an Industrial Petroleum Reserve, propose the necessary implementing regulations if the IPR is advisable, and make appropriate recommendations in the December 1976 SPR report to Congress.

To finance the government portion of the ESR, the Act authorizes: (1) use or exchange of government royalty oil; (2) the purchase or exchange of domestic or foreign petroleum products; or (3) the use or exchange of NPR oil to the extent authorized in the recently enacted P.L. 94-258. Pending a decision on requiring an IPR, the FEA plans to purchase 50 million barrels of crude oil (or products, depending on the final crude-substitution decision) in FY 1977 and 100 million barrels in FY 1978. Funding will be requested to support purchase at the national average price, and acquisition of petroleum for the ESR will have to be consistent with the legal requirements of the Emergency Petroleum Allocation Act of 1973, as amended.

The government has another possible financing option. Under P.L. 94-258, the NPRs could produce enough petroleum to meet ESR and SPR requirements. To the extent allowed by existing market conditions, and applicable law, such amounts could be sold or exchanged in West Coast markets rather than shipped to storage sites, since the transportation of NPR production from Elk Hills, California, to the Gulf Coast, Midwest, or East Coast storage sites would cost an estimated \$0.75 to \$1.00 per barrel. The sale of NPR production would become a source of federal funds to support appropriations to FEA for the purchase of oil. As an alternative, the Administrator could exchange NPR oil directly for oil of the specifications required that is located closer to the storage sites and therefore is more economical than NPR oil. Present planning is to consider the NPRs as a source of federal funds; it is not intended to exchange NPR oil directly for oil to be stored.

Cost

Funds are being requested to purchase the initial 50 million barrels of oil in FY-1977. A planning figure of \$11 per barrel is being used as an estimate of the national average price; the \$11 per barrel assumption results in a budgetary requirement of \$550 million.

Sources

Since foreign crude is the marginal source of new crude supplies, and since it is a foreign crude interruption we are protecting against, it will undoubtedly be the actual physical source of crude stored in the reserve. Although some have speculated that foreign producers might consider purchases of oil for storage purposes to be detrimental to their national interests, the U.S.'s intention to create a strategic petroleum reserve is a matter of public record, and no problem is anticipated. However, the exact countries from which crude oil will be purchased will be determined as crude oil procurement plans are developed.

Rate

The rate of acquisition of crude oil is potentially limited by two factors: the rate of acquisition of storage facilities and the availability of appropriations. Crude oil will be purchased and scheduled for delivery to facilities ready to begin fill. The fill schedule shown

in Figure III-13 is based on the ESR and the SPR legislative requirements of 150 million and 500 million barrels, respectively, and this schedule represents FEA's current target. Appropriations are assumed to be available for the purchase of oil when the facilities are ready to begin fill.¹

¹Section 166 of the Act does not authorize funds for the purchase of oil for the SPR beyond the first 150 million barrels for the ESR. Under the Act additional authorization occurs when the SPR Plan is approved,

Figure III-1
CRUDE IMPORTS 1974-1975

	MB/CD					MMB
	USA ¹	PR ²	VI ³	Guam ⁴	Total	
Jan 74	2,392	190	610	28	3,210	99.5
Feb	2,248	190	398	28	2,864	80.2
Mar	2,462	190	458	28	3,138	97.3
Apr	3,267	190	381	28	3,866	116.0
May	3,748	183	277	28	4,236	131.3
Jun	3,957	239	561	28	4,785	143.6
Jly	4,167	227	619	28	5,041	156.3
Aug	3,852	211	354	28	4,445	137.8
Sep	3,758	193	593	28	4,572	137.2
Oct	3,936	190	344	28	4,498	139.4
Nov	3,997	140	402	28	4,567	137.0
Dec	3,979	159	854	28	5,020	155.6
Jan 75	3,964	212	740	28	4,944	153.3
Feb	4,061	228	429	28	4,746	132.9
Mar	3,853	195	446	28	4,522	140.2
Apr	3,416	221	467	28	4,132	124.0
May	3,493	171	346	28	4,038	125.2
Jun	3,907	185	311	28	4,431	132.9
Jly	4,337	204	690	28	5,259	163.0
Aug	4,661	178	689	28	5,556	172.2
Sep	4,664	206	270	28	5,168	155.0
Oct	4,416	170	807	28	5,421	168.1 ⁵
Nov	4,634	171	489	28	5,322	159.7 ⁵
Dec	4,496	220	590	28	5,334	165.4 ⁵

} 493.2

- 1 Source: Monthly Energy Review December 1975 for data shown from January 1974 - December 1975.
- 2 Source: FEA Weekly and Monthly Petroleum Reporting System (WPRS and MPRS) for data shown from May 1974 - November 1975. FEA estimate for data shown for December 1975. Oil and Gas Import estimates for data shown for January 1974 - April 1974.
- 3 Source: Census Bureau, Summary of U. S. Export and Import Merchandise Trade for data shown from January 1974 - November 1975. FEA estimate for data shown for December 1975.
- 4 Source: FEA Entitlements Office.
- 5 Three highest consecutive months of crude imports. Total is 493.2 million barrels.

Figure III-2

FEA ADMINISTRATIVE REGIONS

Region 1 - Maine New Hampshire Vermont Massachusetts Connecticut Rhode Island	Region 6 - Texas New Mexico Oklahoma Arkansas Louisiana
Region 2 - New York New Jersey Puerto Rico Virgin Islands	Region 7 - Kansas Missouri Iowa Nebraska
Region 3 - Pennsylvania Maryland West Virginia Virginia District of Columbia Delaware	Region 8 - Montana North Dakota South Dakota Wyoming Utah Colorado
Region 4 - Kentucky Tennessee North Carolina South Carolina Mississippi Alabama Georgia Florida Canal Zone	Region 9 - California Nevada Arizona Hawaii Pacific Trust Territory American Samoa Guam
Region 5 - Minnesota Wisconsin Michigan Illinois Indiana Ohio	Region 10 - Washington Oregon Idaho Alaska

Figure III-3
FEA CRUDE OIL MARKETS

<u>Market 1: Northeast</u>	<u>Market 8: Freeport</u>
Massachusetts	West Texas Gulf
Maine	
New Hampshire	<u>Market 9: Central</u>
Vermont	Inland Louisiana
Connecticut	Inland Texas
Rhode Island	Arkansas
	Oklahoma
<u>Market 2: Atlantic</u>	Missouri
Eastern New York	Kansas
New Jersey	Illinois
Eastern Pennsylvania	Indiana
Maryland	Ohio
Virginia	Michigan
District of Columbia	
Delaware	<u>Market 10: Northern</u>
North Carolina	Wisconsin
South Carolina	Minnesota
Georgia	North Dakota
Florida	Montana
Alabama	
<u>Market 3: Northern Inland</u>	<u>Market 11: Rocky Mountain</u>
Western New York	Iowa
Western Pennsylvania	Nebraska
West Virginia	South Dakota
	Wyoming
<u>Market 4: Southern Inland</u>	Colorado
Kentucky	Utah
Tennessee	
Inland Mississippi	<u>Market 12: Inland Western</u>
<u>Market 5: Caribbean</u>	New Mexico
Puerto Rico	Arizona
Virgin Islands	Nevada
Canal Zone	Idaho
<u>Market 6: St. James</u>	<u>Market 13: Contiguous West Coast</u>
Mississippi Gulf	California
East Louisiana Gulf	Oregon
	Washington
<u>Market 7: Port Neches</u>	<u>Market 14: Non-Contiguous West Coast</u>
Western Louisiana Gulf	Alaska
Eastern Texas Gulf	Hawaii
	Pacific Trust Territory
	American Samoa
	Guam

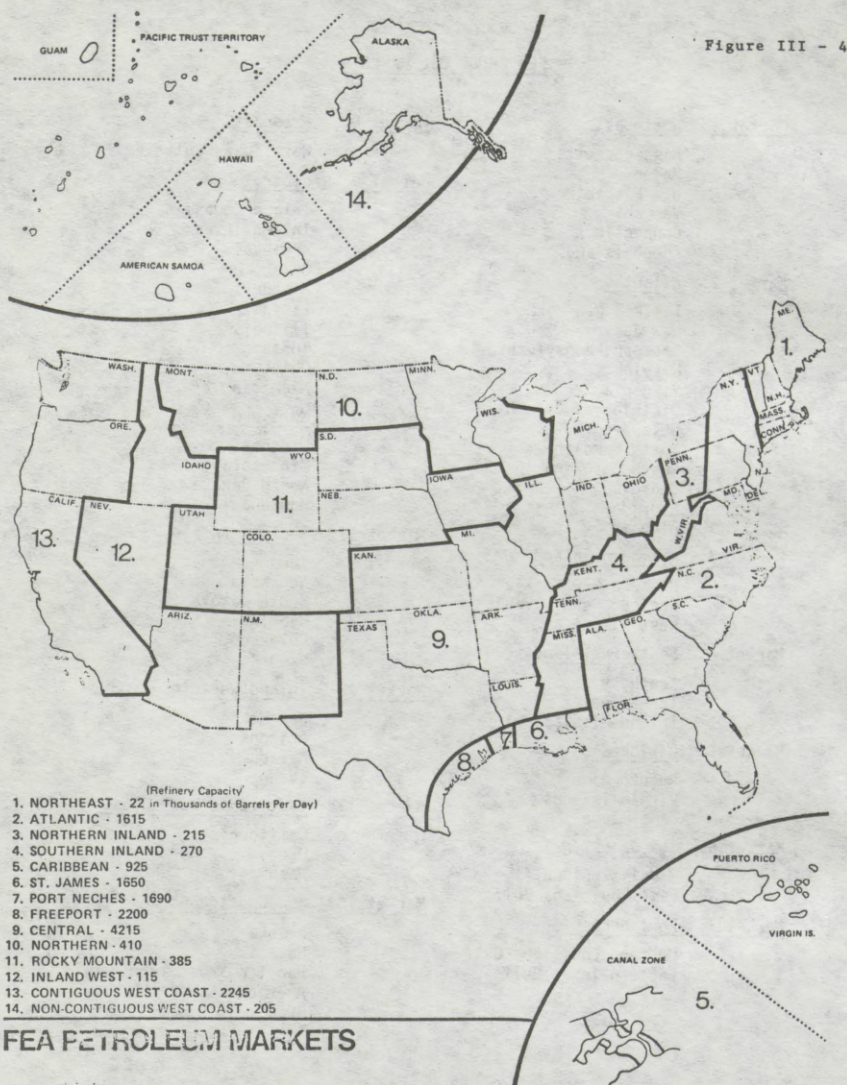


Figure III-5

DEMAND AND IMPORTS OF MAJOR PRODUCTS BY FEA REGION
JANUARY 1973 - DECEMBER 1974 (MB/CD)

FEA REGION	MOTOR GASOLINE			KEROSENE			DISTILLATE FUEL OIL			RESIDUAL FUEL OIL		
	DEMAND ¹	IMPORTS ²	%	DEMAND ³	IMPORTS ²	%	DEMAND ³	IMPORTS ²	%	DEMAND ³	IMPORTS ²	%
1	311	29	9.3	11	0	0.0	323	98	30.3	409	291	71.1
2	566	34	6.0	19	1	5.3	506	105	20.8	638	496	77.7
3	671	10	1.5	23	0	0.0	363	23	6.3	457	308	67.4
4	1,171	1	0.1	52	0	0.0	357	8	2.2	365	303	83.0
5	1,416	0	0.0	37	0	0.0	627	2	0.3	207	16	7.7
6	808	9	1.1	37	1	2.7	299	20	6.7	185	13	7.0
7	429	0	0.0	4	0	0.0	145	0	0.0	19	0	0.0
8	235	1	0.4	4	0	0.0	106	0	0.0	32	0	0.0
9	756	1	0.1	5	0	0.0	172	2	1.2	328	32	9.8
10	242	1	0.4	2	0	0.0	133	0	0.0	84	0	0.0

1 Source: Bureau of Mines Monthly Petroleum Statements and Ethyl Corporation.

2 Source: Bureau of Mines Monthly Petroleum Statements and FEA Office of Oil and Gas Report of Oil Imports.

3 Source: Bureau of Mines Sales of Fuel Oils and Kerosine, 1974.

Figure III-6

CONSUMPTION AND IMPORTS OF FUEL OILS
IN EAST COAST FEA REGIONS
(000 Barrels Per Day)

1973 - 1974 Data

Region	Distillate Fuel Oil			Residual Fuel Oil		
	Consumption ¹	Imports ²	% ³	Consumption ¹	Imports ²	% ³
1	323	98	30.3 ³	409	291	71.1 ³
2	506	105	20.8 ³	638	496	77.7 ³
3	363	23	6.3	457	308	67.4 ³
4	357	8	2.2	365	303	83.0 ³

¹From BOM Fuel Oil Sales Annual

²From BOM Annual Petroleum Statement distributed by FEA Region according to Department of the Interior Oil and Gas Imports Data Base proportions.

³Indicates those FEA Regions and products for which imports totalled more than 20 percent of consumption for January 1973 through December 1974.

Figure III-7

PIES FORECAST CONSUMPTION AND IMPORTS OF FUEL OILS IN
EAST COAST FEA REGIONS
(000 Barrels per Day)

1980 PIES BAU REFERENCE CASE

FEA Region	Distillate Fuel Oil			Residual Fuel Oil		
	Consumption ¹	Imports ²	%	Consumption	Imports	%
1	410	136	33.2 ³	510	401	78.6 ³
2	803	-	0	640	282	44.1 ³
3	675	-	0	414	277	66.9 ³
4	568	-	0	305	203	66.6

1985 PIES BAU REFERENCE CASE

FEA Region	Distillate Fuel Oil			Residual Fuel Oil		
	Consumption	Imports	%	Consumption	Imports	%
1	529	18	3.4	472	281	59.5 ³
2	865	-	0	668	130	19.5
3	810	-	0	454	48	10.5
4	736	-	0	283	-	0

¹ Conversion from PIES Census Regions to FEA regions for both consumption and import forecasts were made through 1974 state consumption data for distillate and residual fuel oils presented in U.S. Bureau of Mines Sales of Fuel Oil and Kerosine in 1974, Tables 13 and 15.

² PIES forecast product imports from Caribbean/Central American sources include shipments from Puerto Rico and the Virgin Islands. The RPR does not require protection against shipments from these areas. Accordingly 108 MB/CD of distillate fuel oils and 316 MB/CD of residual fuel oil were subtracted from PIES forecast imports from this region. These numbers represent actual 1973 production of these fuels in Puerto Rico and the Virgin Islands as reported by the U.S. Bureau of Mines in International Petroleum Annual 1973, Table 2.

³ Indicates those FEA Regions and products for which forecast imports total more than 20% of forecast consumption.

Figure III-8
NON-WESTERN HEMISPHERE CRUDE OIL IMPORTS BY CHARACTERISTICS (AVERAGE BARRELS/DAY)

SULFUR WEIGHT PERCENT									
API GRAVITY	0.01-0.10	0.11-0.25	0.26-0.50	0.51-1.00	1.01-1.40	1.41-1.80	1.81-2.50	>2.50	
>47	41,250	0	150	1,100	0	0	650	600	43,700
45-47	17,500	29,250	350	0	0	0	0	0	47,050
43-44	82,850	75,750	350	0	1,600	1,050	450	550	162,600
41-42	14,350	10,100	0	0	6,650	0	0	0	31,100
38-40	9,200	16,900	0	71,850	12,550	1,800	0	0	112,300
35-37	59,750	332,400	17,620	20,000	19,600	17,700	2,100	750	469,950
34	153,100	27,150	3,000	4,900	31,650	36,800	8,050	50	264,700
33	14,450	13,900	0	1,150	157,900	222,250	27,100	0	436,800
32	1,350	2,150	0	1,200	7,050	76,850	4,750	0	93,400
29-31	14,000	82,200	2,700	62,300	40,300	103,100	10,400	3,900	318,900
25-28	0	19,200	3,850	650	0	3,700	0	25,200	52,600
<25	800	950	0	0	0	3,100	1,450	23,550	29,850
TOTAL	408,550	609,950	28,050	163,200	277,350	466,300	54,950	54,550	2,062,900

Source: FEA Dept. of Interior Oil and Gas Imports Data Base

Figure III-9

PERCENT EACH CRUDE OIL TYPE IS OF TOTAL NON-WESTERN HEMISPHERE CRUDE IMPORTS¹

SULFUR WEIGHT PERCENT

API GRAVITY	SULFUR WEIGHT PERCENT												TOTAL	
	0.01- 0.10	0.11- 0.25	0.26- 0.50	0.51- 1.00	1.01- 1.40	1.41- 1.80	1.81- 2.50	>2.50						
>47	2.0	---	---	0.1	---	---	---	---						2.1
45-47	0.8	1.4	---	---	---	---	---	---						2.2
43-44	4.0	3.7	---	---	0.1	0.1	---	---						7.9
41-42	0.7	0.5	---	---	0.3	---	---	---						1.5
38-40	0.4	0.8	---	3.5	0.6	0.1	---	---						5.4
35-37	2.9	16.1	0.9	1.0	1.0	0.9	0.2	---						23.0
34	7.4	1.3	0.1	0.2	1.5	1.8	0.4	---						12.7
33	0.7	0.7	---	0.1	7.7	10.8	1.3	---						21.3
32	0.1	0.2	---	0.1	0.3	3.7	0.2	---						4.6
29-31	0.7	4.0	0.1	3.0	2.0	5.0	0.5	0.2						15.5
25-28	---	0.9	0.2	---	---	0.2	---	1.2						2.5
<25	---	---	---	---	---	0.1	0.1	1.1						1.3
TOTAL	19.7	29.6	1.3	8.0	13.5	22.7	2.7	2.5						100.0

¹ For preliminary analytical purposes only.

Figure III-10

QUANTITY OF EACH CRUDE OIL TYPE REQUIRED FOR THE ESR¹ (1000s of Barrels)

SULFUR WEIGHT PERCENT

API GRAVITY	SULFUR WEIGHT PERCENT												TOTAL	
	0.01-0.10	0.11-0.25	0.26-0.50	0.51-1.00	1.01-1.40	1.41-1.80	1.81-2.50	>2.50						
>47	3,000	---	---	150	---	---	---	---						3,150
45-47	1,200	2,100	---	---	---	---	---	---						3,300
43-44	6,000	5,550	---	---	150	150	---	---						11,850
41-42	1,050	750	---	---	450	---	---	---						2,250
38-40	600	1,200	---	5,250	900	150	---	---						8,100
35-37	4,350	24,150	1,350	1,500	1,500	1,350	300	---						34,500
34	11,100	1,950	150	300	2,250	2,700	600	---						19,050
33	1,050	1,050	---	150	11,550	16,200	1,950	---						31,950
32	150	300	---	150	450	5,550	300	---						6,900
29-31	1,050	6,000	150	4,500	3,000	7,500	750	300						23,250
25-28	---	1,350	300	---	---	300	---	1,800						3,750
<25	---	---	---	---	---	150	150	1,650						1,950
TOTAL	29,550	44,400	1,950	12,000	20,250	34,050	4,050	3,750						150,000

¹ For preliminary analytical purposes only.

Figure III-11

QUANTITY OF EACH CRUDE OIL TYPE REQUIRED FOR THE SPR (1000s of Barrels).

SULFUR WEIGHT PERCENT

API GRAVITY	SULFUR WEIGHT PERCENT										TOTAL
	0.01- 0.10	0.11- 0.25	0.26- 0.50	0.51- 1.00	1.01- 1.40	1.41- 1.80	1.81- 2.50	>2.50			
>47	10,000	---	---	500	---	---	---	---			10,500
45-47	4,000	7,000	---	---	---	---	---	---			11,000
43-44	20,000	18,500	---	---	500	500	---	---			39,500
41-42	3,500	2,500	---	---	1,500	---	---	---			7,500
38-40	2,000	4,000	---	17,500	3,000	500	---	---			27,000
35-37	14,500	80,500	4,500	5,000	5,000	4,500	1,000	---			115,000
34	37,000	6,500	500	1,000	7,500	9,000	2,000	---			63,500
33	3,500	3,500	---	500	38,500	54,000	6,500	---			106,500
32	500	1,000	---	500	1,500	18,500	1,000	---			23,000
29-31	3,500	20,000	500	15,000	10,000	25,000	2,500	1,000			77,500
25-28	---	4,500	10,000	---	---	1,000	---	6,000			12,500
<25	---	---	---	---	---	500	500	5,500			6,500
TOTAL	98,500	148,000	6,500	40,000	67,500	113,500	13,500	12,500			500,000

Figure III-12
PRELIMINARY
CRUDE SEGREGATIONS & QUANTITIES FOR STORAGE
TOTALS

SEGREGATION CATEGORY		PERCENT OF RESERVE	ESR QUANTITY (MMB)	SPR QUANTITY (MMB)
API °	SULFUR WEIGHT %			
43-47	0.01 - 0.50	6.634	9.951	33.17
38-40	0.01 - 0.50	8.219	12.329	41.095
38-40	0.51 - 1.00	1.927	2.891	9.635
38-40	1.01 - 1.80	1.524	2.286	7.62
33-37	0.01 - 0.50	16.662	24.993	83.31
33-37	1.01 - 1.80	35.829	53.744	179.145
29-32	0.01 - 0.50	2.747	4.121	13.735
29-32	0.51 - 1.00	3.987	5.981	19.935
29-32	1.01 - 1.80	22.471	33.707	112.355
		100.000	150	500

IV. STORAGE AND RELATED FACILITIES

After determining the quantities and types of petroleum products to be stored in the ESR, the type and capacity of existing and potential facilities suitable for that storage can be specified, together with the general location of facilities, acquisition procedures, and transportation for filling the reserve.

TYPES OF FACILITIES

Several types of underground and aboveground facilities are being examined for the storage of crude and refined products for the ESR and the SPR. Underground facilities include existing and new caverns in salt domes, and existing (both operating and abandoned) and new conventional mines. Aboveground storage could be provided by steel tanks and oil tankers as well as other unconventional storage such as rubber bags.

As stipulated in the Act, the ESR will use existing storage capacity, particularly conventional mines and solution-mined caverns in salt domes, to the maximum extent practicable.

The preliminary results of cost and environmental analyses indicate that conventional steel storage tanks and oil tankers are less attractive than underground facilities, mainly because of their higher cost. Further study, particularly of tanks and conventional mines located in consumption regions, is being conducted; however, because of their potential for avoiding refining capacity limitations or transportation delays. Because of the complexity of this distribution analysis, a definitive decision on the possible extent of use of tank storage has not been made. The analysis will be reported and a recommendation will be made in the December 1976, report to the Congress.

Of the three most promising alternatives - converted solution caverns in salt domes, converted conventional mines, and steel tanks - the most cost-effective choices appear to be the existing solution caverns in salt domes and existing mines. Specifically, the full cost of converted solution caverns in salt domes or converted conventional mines and related port and pipeline facilities is estimated at \$1.00 to \$1.30 per barrel, while the cost of steel tanks is estimated at \$5.00 to \$12.00 per barrel.

A summary of the cost of the principal alternatives is shown below:

	<u>Estimated Cost per Barrel With Port and Pipelines</u>	
Converted Salt Dome Caverns and Conventional Mines	\$1.00 to	\$1.30
New Conventional Mines	\$5.00 to	\$6.00
New Steel Tanks	\$5.00 to	\$12.00
Leased Steel Tanks, <u>per year</u>	\$1.80 to	\$3.00

Based on the preliminary estimates that distribution from Gulf Coast salt domes could be effected without delays during an emergency, and the lower cost of salt dome storage, the Plan for the ESR phase of the SPR will consist of underground facilities, including existing solution caverns in salt domes and existing (operating or abandoned) conventional mines converted for storage use. Should the existing mine and salt cavern sites be unavailable at prices comparable to newly constructed salt caverns, then the creation of new caverns in undeveloped salt domes will be undertaken, using the new technique of filling while leaching in an effort to reduce construction time.

In the SPR, the most attractive options are likely to be the filling of additional existing mines and solution caverns in salt domes at sites that are part of the ESR, and expansion of some of these salt dome facilities by leaching new caverns. Preliminary technical studies indicate that a large part of the SPR requirement of 500 million barrels can be met by expanding existing facilities in this way. The detailed study of refining and distribution needs to support the regions will be completed by December and storage within the regions will be included in the plan if it is found to be necessary.

In addition to existing salt caverns and mines, new undeveloped salt domes with virtually unlimited capacity, appear to be economically attractive as a means of providing sufficient storage capacity for the remaining requirements of the SPR. It may be necessary for distributional or environmental reasons to initiate construction on a new site rather than expand on existing caverns, even though, based on cost considerations alone, the latter would appear to be less expensive.

The final choice of facility storage types will be determined by availability of refining and distribution capacity, and by the costs (especially site-acquisition costs), and environmental impacts. Although facility-type recommendations for the SPR will not be made until later in 1976, it is anticipated that a combination of domes and mines will be included.

Solution Caverns in Salt Domes

Existing and newly leached caverns in salt domes are probably the most attractive storage form, from the standpoint of scheduling, cost, environmental, technical and security considerations.

Salt domes, formed several million years ago, are masses of salt that intruded or upwardly dislodged overlying rock formations. Near the surface they are generally 1 to 3 miles across, extending to greater dimensions with depth. The distance from the surface to the top of the salt for Gulf Coast salt domes varies from 0 to 4,000 feet or more. Rock salt has a combination of characteristics that makes it highly attractive for cavern construction and petroleum storage. If relatively pure and not interbedded with other types of rock, it is generally impervious to liquid and gas, has a compression strength comparable to concrete under the weight of the overlying and surrounding rock, moves like plastic to seal incipient fractures, and can be mined easily by dissolving (leaching) with water. Construction is feasible wherever an adequate water supply and conditions for brine disposal coexist.

The feasibility of using leached caverns in salt has been demonstrated in France and Germany, where significant amounts of crude oil are currently being stored, and in the United States, where natural gas and petroleum-related products have been stored. Space for about 60 million barrels of crude and refined product storage is already available near Manosque, France. One major crude oil facility is now under construction near Blexen, East Germany, where a 30-million-barrel facility is being developed and

the West German Government is planning an 80-million-barrel facility near Etzel. In North America, over 900 solution-mined caverns, with a total capacity exceeding 300 million barrels, have been developed in salt deposits and converted for storage. These caverns store such diverse products as natural gas, propylene, propane, butane, ethylene, pentane, and other hydrocarbon fuels. FEA has examined the potential of the approximately 450 onshore salt domes in the Gulf Coast region; several offshore salt domes in the Gulf of Mexico; and major salt beds, especially those with existing mines or leached caverns.

Excluding caverns in use for hydrocarbon storage and others not ideally situated geographically with respect to the refinery distribution system, existing leached space (in excess of 200 million barrels in capacity) in salt domes in the Gulf Coast Basin--the only major salt dome basin within the continental United States--is potentially convertible for the ESR and the SPR programs.¹ A good portion of this capacity can be converted and filled in the 3-year ESR time-frame. Moreover, this capacity is located close to existing crude oil refining centers and related pipeline distribution networks, thus facilitating filling and withdrawal. In addition, environmental impacts associated with the conversion of existing caverns in salt domes, such as the use of large volumes of water and the disposal of saturated brine, do not appear to be severe and are being addressed in environmental impact studies.

Virtually an unlimited amount of new storage space can be provided through construction of new caverns in onshore and offshore salt domes in the Gulf Coast region,² most of which are geologically acceptable for such construction. No major technical problems are anticipated in constructing onshore leached caverns, and preliminary studies indicate that offshore construction and storage are feasible and would permit acquisition of oil for new caverns to commence a few months after leaching is initiated. Prototype-sized facilities of 50 million, 100 million, and 200 million barrels of capacity are being examined at a number of sites in the Gulf Coast area.

¹ Although more sites are available for conversion, this estimate is based on the number of sites likely to be included in the ESR on the basis of feasibility studies, which consider cost, technical, distributional, and environmental matters as well as current use.

² While a large number of potential sites exist with virtually unlimited capacity, this potential capacity could not be made available so as to meet the earlier targets and requirements of the Act.

Like the existing salt caverns, the undeveloped salt dome sites are located in the Gulf of Mexico region, close to existing and projected crude and product transportation networks. No significant environmental impacts are expected from the construction of onshore facilities that utilize underground brine disposal or brine disposal at sea, where proper mitigating measures are followed. Offshore construction is more technically complex and is therefore being carefully studied. Offshore construction, however, offers three particular advantages: (1) the sites could be in federal waters (negligible acquisition cost); (2) the water supply for solution mining and petroleum withdrawal would be infinite, and minimum horsepower would be required for pumping; and (3) facilities could be easily concealed.

Bedded salt deposits like those in Michigan, New York, Montana, Wyoming, Kansas, Arkansas, and Texas were considered in the prefeasibility studies. Many of these bedded deposits have active and abandoned mines. In general, these beds are not easily accessible to the refinery-distribution system, and the existing mines could service only a limited area. Further, they frequently have significant salt creep associated with them and, in view of their relative thinness, are not as attractive technically, environmentally, or economically for storage of petroleum products as salt domes and other existing mines.

Mines

A second attractive type of petroleum storage facility is underground conventional mines. Although no crude oil is currently stored in mines in North America, the practice is in use in Europe and South Africa, where strategic and economic pressures have led to the use of mines. Within the United States, there are more than 20,000 operating or abandoned mines as well as extensive areas in which the rock is potentially suitable for the construction of new underground storage facilities.

Technical characteristics such as rock type, depth of excavation below the surface, cavern geometry, and control of water inflow are important in evaluating the suitability of an individual mine. To be useful as a storage site, a mine must be structurally stable; the surrounding strata must be relatively impermeable, free of fractures, faults,

joints, and seismic activity and the host rock must be nonreactive with the stored petroleum. Seepage into the mine is usually permissible or even desirable, and in some cases actually provided for during construction or conversion to contain the oil in the mine. The groundwater level, therefore, should be above the cavern to provide the necessary hydrostatic pressure to prevent losses of oil into the surrounding strata.

Existing underground mines with an estimated capacity of about 170 million barrels are potentially convertible for the ESR and the SPR programs.¹ A portion of this capacity is potentially convertible within the 3-year ESR timeframe. In addition, FEA is investigating the potential of numerous other sites that have been recommended as a result of public interest in the Act. Salt, limestone, and iron mines located in the South and Midwest appear to be the most attractive site possibilities. Some of the mines developed in salt domes were examined and found acceptable, whereas other mines are found in bedded salt deposits lying either too close to the surface or at excessive depths for feasible storage use (such as in the Michigan and Williston Basins and southern Arkansas). The environmental and safety impacts at each of the acceptable sites appear to be controllable. Coal mines were initially considered but eliminated for use in the ESR or SPR. Operating coal mines are too valuable for their coal; abandoned coal mines are generally structurally unsafe, may contain explosive gases, and usually have sealed entrance shafts that make inspection infeasible. New mines are not feasible for strategic storage of crude in the ESR because of their 3-year construction lead times as well as their estimated construction costs of \$5-\$6 per barrel.

Conventional Steel Tanks

Because of the high initial cost of construction, steel tanks that are currently being used for petroleum storage are kept in service to the maximum possible extent. Therefore, there is relatively little excess tankage available for lease on a continuing basis. However, nearly 15 million barrels of existing steel tankage have been identified and are potentially available in government-owned facilities or private tank farms for short- or long-term leasing from the private sector. In addition, potential sites for new tank construction, with several times this capacity, have been identified. The leased cost

¹ Although more sites are available for conversion, this estimate is based on the number of sites likely to be included in the ESR on the basis of feasibility studies, which considered cost, technical, distributional, and environmental matters.

of tank storage estimated at approximately \$1.80 to \$3.00 per barrel per year varies from region to region. New tank construction varies from \$5.00 to \$12.00 per barrel depending on a variety of factors. These costs would of course rise if the government attempted to bid them away from private sector uses, and the result could be no net increase in national storage.

Because of their relatively higher cost, the use of conventional steel tank storage has not been planned as part of the ESR on either a lease or purchase basis. If storage of residual or regional product is required and other less expensive methods are not suitable, the requirement would be satisfied through the use of available, excess, government-owned tankage, leased existing tankage, or leased new tankage.

Oil Tankers

The possibility of using idle oil tankers for the storage of crude oil or refined products is being examined. On the basis of this analysis, it has been preliminarily concluded that the storage of petroleum products in idle tankers is technically feasible for the ESR program. Indeed, they would provide a flexible means of storage near major ports and coastal refineries. However, the estimated cost of leasing such facilities is high compared with the costs associated with existing underground facilities. Further, there may be environmental impacts, such as hydrocarbon emissions, waste disposal, and leaks associated with tanker storage that would require careful and detailed studies, including costs of mitigating measures, before significant idle tanker capacity could be utilized, even if considered economically feasible. Finally, storm damage or collision could release large quantities of oil that would cause major environmental damage. Thus, the use of idle ocean tankers for storage purposes is not planned.

Other Storage Modes

The use of other storage modes, such as refilling depleted oil reservoirs, shut-in capacity, and double-lined synthetic rubber bags, have been examined. The slow withdrawal rates, the uncertain recovery factor, and the impracticality of several crude segregations eliminated depleted oil reservoirs from further consideration. Standby production capability was eliminated because of its inability to produce at a rate that will satisfy demand during a supply disruption.

Shut-in capacity has been eliminated as an alternative because it is too expensive, it has an insufficient withdrawal rate, and it is generally not well located in relation to existing distribution networks. The Elk Hills, California, Naval Petroleum Reserve (NPR-1), which has estimated reserves of 1.2 billion barrels, is an excellent illustration of the limitation of a shut-in reserve. Currently, NPR-1 is capable of producing approximately 130,000 barrels per day from existing wells within 90 days of production authorization. Furthermore, the Department of the Navy has estimated that the production capability could be increased to approximately 200,000 barrels per day within 5 years.

At maximum efficient rate (MER), then, it would take 7 years for the Elk Hill field to produce enough crude oil to meet the SPR storage requirement, (i.e., 500 million barrels). At 270,000 barrels per day, Elk Hills could produce only 48 million barrels during a 6-month interruption. Since there is a relationship between the size of the reserve and its pumping rate, a shut-in reserve of 10 billion to 20 billion barrels would be needed to provide the same level of protection afforded by the SPR. In addition to the oil field exploration and development costs and the opportunity cost of 10 billion to 20 billion barrels of oil, a major standby pipeline system would have to be financed and built to move the oil from the fields--in this case, California--to the areas impacted by an interruption--the East.

The technological and economic uncertainties of the double-lined synthetic rubber bags tend to make them unattractive for consideration in the ESR. But because of their locational flexibility and projected costs, which are comparable to salt caverns, these methods will be examined further.

FACILITY LOCATION

During the past 9 months, the FEA has conducted technical, distribution, environmental, and economic analyses of each of the major types of storage. The universe of possible storage sites for the ESR was examined, and those sites that were less viable candidates for further feasibility study were screened out. For example, because of the 3-year time-frame for the ESR, existing salt dome cavities, mines, and tanks were considered the prime candidates for the feasibility efforts, although the technique of filling while leaching could be used recognizing the schedule slippage. These feasibility

studies were designed to identify those underground sites and tank-farm locations most suitable for further, detailed, technical, and environmental studies, and resulted in the selection¹ of a number of sites throughout the country.²

FEA's examination of potential ESR sites is continuing and is scheduled to be completed in mid-1976. Preliminary discussions will be held with site owners in an effort to ascertain the feasibility of acquiring the properties through negotiation. Where necessary and appropriate, the Act's authority for acquisition by eminent domain might be employed. However, if condemnation procedures are considered inappropriate, site-specific feasibility studies and environmental assessments will be terminated and the site will no longer be a candidate for the program.

For the SPR, the FEA has been conducting detailed analyses of many undeveloped salt domes (including onshore and offshore locations) and major salt beds with different technical, distributional, and environmental characteristics, selecting for further analysis those sites that were most advantageous or desirable for petroleum storage. Time permitting, additional sites will be considered if the sites currently under investigation are found to be technically or environmentally unacceptable. These analyses are also scheduled for completion in mid-1976, and their results will be included in the SPR Plan. Considering the large number of developed and undeveloped salt domes under investigation, compared with the relatively small number needed for the SPR, it is unlikely that suitable properties cannot be acquired by negotiation or condemnation.

In making these preliminary site selections, the FEA has applied six major criteria: (1) near-term (i.e., 3-year) and longer term (i.e., 7-year) capacity, (2) accessibility to distribution system, (3) technical desirability, (4) extent of environmental impacts, (5) feasibility of acquiring the

¹ Selection refers to the choice of candidate sites for further technical, cost and environmental study, and in no way implies a final decision has been made that any candidate site will definitely be utilized as part of the storage program.

² To preserve the government's position in acquiring existing salt cavern and mine sites and related distribution and tank facilities, the specific sites being considered and their cost estimates have not been included in this Plan.

sites, and (6) costs. These same criteria, which are discussed in detail below, will be used in making the final selection of sites to be included in the ESR and the SPR Plans when final environmental, technical, and cost information is available in mid-1976.

Capacity

To respond to the needs of both the ESR and the SPR, candidate storage facilities were selected on the basis of their available capacity in the short term (i.e., 3 years) and their total capacity over the longer term (i.e., 7 years). Specifically, to provide the rapid storage capacity required for the ESR, efforts were concentrated on existing salt caverns and mines with potentially usable capacity prior to December 1978.

The initial candidate underground sites considered for the ESR have a combined capacity of about 15 million to 20 million barrels by June 1977, approximately 150 million barrels by December 1978, and approximately 200 million to 300 million barrels when completely converted. In addition, many can be expanded to accommodate further storage, as required, for the SPR.

Accessibility

To respond to petroleum demand during a supply interruption, storage sites must have access to appropriate existing distribution facilities (e.g., ports and pipelines).

Access to ports and pipelines was particularly important because, with the exception of petroleum imports from Canada, which were over 600,000 barrels per day in early 1975 but which will be terminated by the early 1980's all oil subject to disruption enters the United States by water. Of the average daily 4.1 million barrels of crude oil that entered U.S. ports in 1975, between 450,000 and 600,000 barrels per day were transshipped significant distances by pipeline. This crude oil flowed mainly to refineries in the Central petroleum market. The remaining 3 million barrels per day of crude were usually refined fairly close to the ports in which they were off-loaded--roughly 1.1 million barrels at East Coast ports, 700,000 barrels in Puerto Rico and the Virgin Islands, 600,000 barrels at Gulf of Mexico ports, and 600,000 barrels at West Coast ports.

To minimize response time during an emergency, the FEA selected for detailed consideration, facilities that could, to the maximum extent possible, be connected directly to major pipelines and/or ports. Ports will provide accessibility to the major areas of need--i.e., East Coast, the Louisiana and Texas Gulf region,¹ Puerto Rico, the Virgin Islands, and if necessary, the West Coast--and to secure refined-product sources in the Caribbean. In addition, an effort was made to select ESR sites with existing docks, pipelines, and waterways that could be used to expedite filling them.

To ensure that sites selected for both the ESR and the SPR would be able to store and deliver crude oil in appropriate quantities to meet regional requirements, the FEA determined likely requirements for each petroleum market. These requirements were based on: (1) the extent the market depends on petroleum imports; (2) the refining capabilities of each market (e.g., capacity and flexibility); (3) the capacities and flexibility of the petroleum distribution network; and (4) the extent of demand restraint in the market. Candidate sites have been selected to provide the greatest practical flexibility in providing for these markets.

Absence of Technical Restrictions

Potential sites with technical (e.g., structural) restrictions that would significantly delay construction or increase conversion costs were eliminated. All candidate sites and their related distribution facilities are believed to be free of any major technical conversion problems. Further studies are being conducted to determine how vulnerable the sites are to operational disruptions.

¹ The Louisiana and Texas Gulf are also the originating points for the Texoma, Seaway, and Capline pipelines. Although these pipelines will be directly tied to storage facilities, they also could be reached by water in the event of unforeseen requirement levels or localized system failure.

Extent of Environmental Impacts

Each candidate site is being evaluated on a preliminary basis in terms of the potential environmental damage that might occur if the site were used for the storage programs.¹

For salt caverns, each site is being evaluated on availability of fresh, brackish, or sea water for leaching or withdrawal of oil, and on ease of disposing of the saturated brine produced by leaching or by filling. (With cavern conversion, the brine generated is equal to the amount of oil stored, and occurs during the filling operation. New construction generates 7 barrels of brine for every barrel of storage developed.) Brine can be disposed of in nearby nonpotable waters, which may or may not be environmentally detrimental; injected deep into natural underground salt water aquifers near the dome; or disposed of in the Gulf of Mexico. The latter two methods appear feasible and have been used successfully in the past. In addition, many of the candidate sites are located near chemical plants that use saturated brine as feedstock, thus minimizing somewhat the brine disposal problem. In addition to water-related issues, salt caverns have the usual environmental problems associated with construction of access roads, pipelines, and on-site structures and with seismic hazard.

The environmental evaluations of conventional mines include consideration of the impacts of construction of pipelines, access roads, and corridors for utilities as well as flood and seismic hazard, the disposal of limited spoil and other water pollution problems, and the venting of hydrocarbon gases.

Acquisition Feasibility

Salt dome and mine sites were also evaluated in terms of how readily they could be acquired. Consideration was and is being given to whether the sites are developed (i.e., possess existing caverns) or undeveloped. In the case of operating mines the interests of the owner and lessor (if other than the owner) were considered and evaluated to determine whether the site could be considered a candidate for the program from the standpoint of relocation of operations.

¹ A Draft Strategic Petroleum Reserve Programmatic EIS is scheduled for public release in May 1976. Site-specific environmental impact statements will be prepared and filed for each candidate site prior to selection as part of the ESR and the SPR programs. These site-specific EISs will be prepared in draft form commencing in May 1976.

Costs

For each candidate location, preliminary estimates have been made of the cost of the site acquisition, architectural and engineering design, construction and operation of the sites and related facilities (including pipelines, port facilities, and other distribution requirements), and environmental control. These costs will be used to compare the various sites from an economic standpoint when final site decisions are made.

ACQUISITION

The storage system in any one locale consists of one or more storage facilities and the ancillary pipelines, environmental controls system, pumping stations, tanks, terminals, and port facilities necessary to receive oil from and deliver it to the existing distribution infrastructure. The Government must acquire the property or right-of-way to all the elements of the storage system through purchase, lease, or condemnation. It is possible that some portions of the storage system will be government-owned and government-developed, while other elements will be privately developed and leased to the government.

In determining the feasibility of acquiring different kinds of sites, the FEA will have to take a number of factors into consideration for each type of site:

- o Existing and undeveloped domes. The acquisition of salt caverns involves existing surface rights, mineral rights, storage rights where new leached caverns are required, and such other rights as may be required for storage security. The legal question about the rights to use existing caverns in salt domes for storage can be quite complex. In some situations, surface, mineral (either fee or lease-hold), and storage rights are held by different parties, making negotiation of a purchase difficult or lengthy.
- o Existing conventional mines. Mines under consideration are either abandoned or currently operating. Again, surface rights, storage rights in created cavities, and mineral rights involving other necessary interests may have to be acquired. Legal problems associated with ownership of surface rights and storage rights exist here as well.

- o New aboveground storage. Sites for constructing new aboveground storage are also being evaluated, and several suitable locations for which no acquisition problems are anticipated are under consideration. If the need for regional storage could be satisfied more economically by underground storage, no aboveground storage of products would be required.

Once the feasibility of sites has been determined and final site selections have been made, the actual process of construction/conversion begins.

Facility Construction/Conversion

The development of storage facilities for the ESR will require at least 2 to 2-1/2 years from inception of detailed facility design through completion of construction. The SPR program will take an additional 2 to 4 years to complete. To ensure that construction is completed in time, both programs will require significant private sector participation in the form of detailed feasibility studies; architectural and engineering designs studies; and actual construction of site facilities, connecting distribution systems, port facilities, water purification facilities, and aboveground support tankage. In addition, internal project scheduling and control measures will need to be established and enforced.

- o Feasibility studies. The preliminary and site-specific feasibility analyses begun in July 1975 and scheduled for completion in April and May 1976 represent the first step in the construction process. The output of these studies, beyond establishment of technical feasibility, will be preliminary cost estimates, schedules, design drawings, and equipment specifications from which final design plans and specifications for selected sites will be developed. To the extent long lead-time material and equipment procurements (e.g., piping, pumps, casing, and wellheads) are on the critical path, preliminary equipment specifications will be developed so early procurement of these items can be initiated. Lists of material requirements are being developed, and the specifications of these requirements will be incorporated in procurement documents.

- o Design studies. The purpose of the design phase for each site is to develop plans and specifications so that potential construction contractors may bid on developing the required facilities. The final design planning will extend over a 6 to 12-month period, beginning approximately June 1, 1976. The contractor qualification program to select suitable architectural/engineer/management firms that can accomplish detailed feasibility studies as well as preliminary and final design planning has already begun.
- o Construction. Actual construction work will commence in the latter part of FY 1976, after completion of site-specific environmental impact studies, site selection, acquisition, and necessary design and engineering drawings.

The construction work at each site will consist of facility development and related facility construction. Facility development includes cavern construction in the case of undeveloped sites, or enhancement of developed sites and all associated brine injection wells, valves, pumps, connections and lead lines. Related facilities include manifolds, pumps, and pipelines to port or major pipeline systems, and terminal facilities (e.g., docks and unloading facilities). For the most part, construction on these elements can proceed concurrently, with the appropriate connections to be completed at the end of the construction period. Preliminary scheduling indicates that distribution pipeline connections and terminal facilities will be critical in terms of construction time required.

The construction contracting arrangements will probably differ from site to site. Where it is deemed appropriate and in the public interest, FEA will give full consideration to the present owner/leaseholder preferences for participation. For example, a number of candidate site owners have indicated an interest in undertaking certain parts of the site-related development work (e.g., cavern conversion to storage and associated site facility development) themselves. The owners of some of the major distribution pipelines and terminal facilities have indicated a willingness to evaluate the possibility of their undertaking some of the construction (e.g., tankage and pier construction) at the terminus of the distribution pipelines. Consequently, site-related construction could be included in the site purchase/lease contract

with the present owner. Thus, private development of storage facilities for the government is an option to be considered. However, if the storage objectives of owner/leaseholders are not consonant with the interests of the government, storage will be developed by the government.

- o Project scheduling and control. The 3-year ESR storage requirements impose a timing constraint on the site-development process that demands careful project management, especially of all design and construction activities. To this end, the FEA is currently installing a computerized project management system based on critical path method (CPM and PERT) scheduling techniques. Schedules will be developed for each site and, as the critical activities are identified, they will be carefully monitored. The selected construction managers will also provide detailed project scheduling and cost control. Early identification of the volume of construction contemplated within the time constraints of the ESR program may involve some material shortages. For example, several facilities to be developed concurrently in the same geographic location may cause spot shortages of construction labor and equipment. The project management system will be used to identify these resource constraints and to adjust schedules to expedite these items.

Of equal importance to the construction of the sites are their costs, the method of financing, and the time constraints in acquiring the sites.

Facility Cost, Financing, and Rate of Acquisition

ESR facility costs have been estimated and cost planning factors have been developed on the basis of feasibility studies. Based on these cost estimates, a 150 million barrel ESR stored entirely in underground storage would cost between \$1.00 and \$1.30 per barrel.

To ensure facility acquisition and construction to meet the ESR requirement of 150 million barrels in 3 years, storage facilities that could be filled to 150 million barrels in 3 years are proposed to be financed by the government through appropriations authorized by the Act.

To fulfill the ESR requirements of 150 million barrels within 3 years, FEA will begin to acquire sites and begin design/construction by October 1976. In addition, FEA has developed a stringent, 2-year schedule for underground storage facilities needed for the ESR. (See Table IV-2.)

Table IV-2

ESR UNDERGROUND STORAGE SCHEDULE

<u>Time Period</u>	<u>Storage Capacity (In Millions of Barrels)</u>	
	<u>Incremental</u>	<u>Cumulative</u>
January-December 1977	60	60*
January-December 1978	90	150

* Although the Act establishes a target of 10 percent of the SPR (i.e., 50 million barrels) be in storage by June 1977, the FEA considers it unlikely that construction of underground facilities of this capacity can be accomplished by June 1977.

During development of the ESR, the design, purchase, construction, and lease of facilities for 200-300 million barrels of storage will be started. Due to fill rate limitations, only 150 million barrels of the total storage volume will have been filled during the first three program years, i.e., by December 1978. The remaining existing capacity at these sites will be filled for the SPR. The remaining capacity required to achieve SPR goals of 500 million barrels in 7 years could be achieved by creating new caverns in already developed storage sites or on virgin sites, depending on whichever is most cost effective in light of overall storage system distribution requirements.

TRANSPORTATION

As part of the preparation for ESR storage sites, distribution systems for each site will be designed and constructed so that, in aggregate, the sites can receive and deliver crude oil at rates sufficient to meet program targets. For sites that have direct access to port facilities, the transportation system will consist of a pipeline running from the site to dock facilities and possibly to a major pipeline. For inland sites, the related distribution facilities will consist of a pipeline extending from the site and connecting with a major pipeline such as Capline.

To the maximum extent possible, site-related distribution facilities will be coordinated with existing facilities. For all inland sites, preliminary study indicates that adequate unused capacity to meet fill rate targets exists in the related major pipelines and their dock facilities. However, many of the sites with water access will require the construction of new, or modification of existing, port facilities. These new or modified facilities would be used for withdrawal of stored petroleum as well.

The Maritime Administration (MARAD) is assisting in the study of water-related facilities by analyzing:

- o Port facility requirements and associated costs to meet fill and withdrawal rates.
- o Regulations and authorities that would affect water traffic or construction of port facilities associated with the reserves.
- o The availability, sources, and costs associated with tankers and barges needed for the transport of reserve oil during both fill and potential withdrawal periods.

In addition, they are developing a distribution model to simulate traffic movements.

To meet the timed fill requirements for the ESR, fill of storage facilities will occur at an average rate of 270,000 barrels per day from early in 1977 to completion of the reserve in 1982. This delivery level would require not more than 3 million dead weight tons (dwt) of tanker capacity.¹

¹ This figure is based on the conservative assumptions that all fill crude is transported in tankers with an average round-trip time of 80 days, and that there are 6.5 barrels of crude oil for each dwt.

Given the magnitude of existing excess tanker capacity as a result of a prolonged slump in the worldwide market for tankers, it should not be difficult to secure up to 3 million dwt at reasonable rates. For example, at the end of 1974, the world tanker fleet totaled 255 million dwt capacity with another 53 million dwt scheduled for delivery in 1975 and 1976, while demand stood at less than 215 million dwt. In early 1975, about 7 million dwt were idle in the Persian Gulf alone, waiting for spot cargoes; in 1976, tanker availability is estimated at 16.5 percent, dropping to 13.1 percent in 1977. In addition, the world's Very Large Crude Carrier (VLCC) fleet was slow steaming at twelve knots instead of the usual fifteen knots. However, water depth at port facilities associated with ESR and SPR sites will place constraints on the size of tankers that could be serviced at any site. The FEA, with the assistance of MARAD, is currently pinpointing acceptable tanker sizes for each candidate site. Preliminary findings indicate that most program-related port facilities will not be able to accommodate tankers larger than 50,000 dwt. Therefore, if larger tankers were used, the crude oil would have to be reloaded onto barges. Initial study indicates that this process would be significantly more expensive and that barge availability may pose a problem. Therefore, the requirements for barges are being examined in more detail, and steps are being taken to minimize program dependence on them during fill.

V. MONITORING AND CONTROLLING THE RESERVE

The ESR will require procedures and mechanisms to ensure the integrity of the purchase, transport, storage, and distribution of the crude oil and refined products stored in the reserve. Four types of controls and monitoring are required:

- o Financial audit controls
- o Purchasing and receiving controls
- o Site security and storage monitoring
- o Withdrawal controls.

These controls are necessary to minimize costs and maintain the integrity of the system. The integrity of the storage system is necessary to ensure that policy decisions and operations are based on accurate data, and to ward off the severe adverse consequences that could accrue during an energy supply interruption from a loss of integrity.

FINANCIAL AUDIT CONTROLS

Auditing controls and procedures will be developed for all government-owned and privately owned/government-leased facilities. Documents will be developed and maintained for all activities, including acquisition and development of facilities, filling, inventorying, maintenance, and withdrawal. Each seller, purchaser, monitor, and administrator at the regional and national levels will be responsible for maintaining documents that readily lend themselves to audit.

FEA auditors will perform frequent regional and national audits; less frequent audits will be performed by private auditing firms to provide checks as needed. In the case of privately owned/government-leased storage facilities, the leases will include a requirement to create and maintain a custody and auditing system. In addition, before such facilities are leased, the FEA will: (1) establish criteria, (2) review internal control systems of firms wishing to participate in the program, (3) certify qualifying firms and facilities, and (4) advise unqualifying firms on improvements necessary to meet criteria.

PURCHASING AND RECEIVING CONTROLS

Stringent measurement controls will be developed and used for the filling process. These controls will be in effect at receipt of product, during fill, and at completion of fill. At delivery, the product will be inspected for its specific gravity, sulfur content, viscosity, and sediment to ensure that various grades of crude and product are not mixed, and that the product already in storage is not degraded. The data obtained will be recorded and cross-checked with purchase orders. Throughout the fill, samples will be analyzed for chemical composition. After the fill, samples will be taken periodically, and quantity and quality measurements will be made.

SITE SECURITY AND STORAGE MONITORING

During the storage of crude oil, it will be necessary to protect the facilities against theft, fraud, sabotage, and fire or other physical damage. To this end, FEA will establish site security and storage monitoring systems.

The FEA will provide for regular maintenance and fire protection of all government-owned and -leased storage facilities and pipelines. Security forces will be supplemented by such mechanical means as fences, ground lighting, locks, and personnel-access security systems. In addition, the integrity and reliability of facility personnel will be ensured through careful background investigations, hiring practices, bonding, and job rotation.

If an IPR is implemented and any portion is stored in nongovernment facilities, industry would be responsible for the physical security of the facilities and petroleum products. However, these facilities would be subject to audit and inspection by the government.

Scheduled and unscheduled inspection and checks of inventory will be carried out. During such checks, investigators will verify that the actual volumes of storage indicated by the monitoring system match the audited records. Specimens of the stored petroleum products will be laboratory-tested to ensure that the audit-indicated type of inventory matches actual storage type, and that no product degradation has occurred.

Inventory will also be inspected periodically for contamination. Peculiarities of each storage method will

necessitate monitoring for specific problems such as loss of site integrity, contamination from seepage, and control of brine/water displacement in underground storage.

Finally, measurement and monitoring gauges will be inspected frequently to ensure the integrity of the equipment. Loss or change-of-fill tolerance limits will be established, and deviation from accepted standards will result in immediate investigation.

WITHDRAWAL CONTROLS

A strict system for governing and controlling withdrawal from the facilities will be developed and implemented. No withdrawals will be made without the proper authorization. As with filling, withdrawals will be metered and checked against monitor-indicated volumes before and after withdrawal.

VI. USING THE RESERVE

The measure of the ESR's effectiveness will be its ability to lessen adverse economic, social, or political impacts on the nation that might result from an interruption of petroleum supplies. Even the threat of a supply interruption could have adverse economic impacts. Because it relies so heavily on planning and long lead times, our highly integrated economy is vulnerable to such a threat. The embargo of 1973 came suddenly. Although there was a several-week supply already in storage or in transit, even the prospect of a shortage caused confusion, uncertainty, and economic disruption. The distribution plans to be developed for the ESR and the SPR are intended to reduce our vulnerability to the threat as well as the actuality of a future supply interruption.

Congress has authorized FEA to prepare a number of responses to any future supply interruption, including:

- o Voluntary demand restraint programs and the machinery of the allocation program that can be activated almost immediately.
- o Production of domestic petroleum from certain fields at higher than normal rates (temporary emergency rates of production).
- o Energy conservation contingency plans which would be implemented after approval by Congress.¹ These plans, which would impose reasonable restrictions on public and private use of energy, will be implemented so as to be consistent with the level and projected duration of the import disruption and with the amount of reserves on hand. During this period, FEA would adjust the reserve drawdown rate to minimize adverse economic impacts, taking into consideration demand restraint programs, the public's ability to adjust to the shortage, the amount of reserves remaining, and estimates of the duration of the shortage.
- o Rationing contingency plans which would be implemented after approval by Congress.² However, be-

¹ Section 201 of the Act established procedures to be followed by the President before implementing energy conservation contingency plans.

² Section 201 of the Act established procedures to be followed by the President before imposing a rationing contingency plan.

cause of the large investment required for gasoline and diesel fuel rationing, and because of its disruptive influence on people's lives, this tool would be used only if other, less pervasive measure proved insufficient.

As the foregoing indicates, in the event of a serious supply interruption, one of the early steps is the activation of the ESR (or SPR). To understand how the reserve would be activated and used, this portion of the plan addresses: (1) the trigger mechanism; (2) drawdown strategy; (3) allocation; and (4) distribution. A more detailed description of this portion of the plan will be completed prior to the initial storage of oil.

TRIGGER MECHANISM

Section 161(d) of the Act authorizes the President to activate the ESR and the SPR distribution plans. Specifically, the President may order distribution in the event of a "severe petroleum supply interruption"¹ or to satisfy an obligation of the United States under the IEP.

In the case of a severe supply interruption, the Administrator of FEA will recommend to the President specific action on the use of the reserve. To enable the Administrator to make this recommendation, FEA will need to identify the probable scope and effect of a U.S. supply interruption before its impact is felt. A disruption would probably be preceded by diplomatic warnings or at least by notification from shippers and refiners of interruptions in incoming shipments. Once curtailments are indicated, FEA will identify the extent of the potential shortfall by reinstituting a weekly reporting system similar to that used during the 1973-74 disruption. This system, which has been improved on the basis of FEA's experience during that embargo, will include reports by importers and refiners of imports in transit, domestic production and import receipts, inventory levels, refinery throughput, and sales or usage.

In view of the dynamics and sensitive nature of a deliberate supply interruption, it is not wise to select an absolute level as the trigger for activating the ESR and the SPR. The President must have the flexibility, within the legal requirements, to deal with various

¹ A severe energy supply interruption is defined in the Act as "a national energy supply shortage which the President determines: (a) is, or is likely to be of significant scope, and duration, and emergency nature; (b) may cause major adverse impacts on national safety or the national economy; and (c) results, or is likely to result, from an interruption of imported petroleum products, or from sabotage or an act of God."

contingencies. Thus, several factors of critical importance in making such a decision will probably not be known until the interruption actually occurs. These include the extent, source, and estimated duration of the disruption and the extent of U.S. dependence on foreign imports at the time. The projected impact of the interruption on our economy and the amount of supplies available to refiners will be of particular importance to FEA in making its recommendation to the President.

Given this approach, a small import shortage (e.g., less than 4 percent of total domestic consumption) would probably not activate the reserve; a shortage of this magnitude could be met by a combination of emergency increases in domestic production and institution of minor demand restraints. A moderate shortage (e.g., 4-6 percent of total domestic consumption) would affect employment and GNP negatively to some extent, but could be managed by more stringent demand restraints and by the allocation program, without requiring the use of reserves. For a shortfall of this size, a decision to use the reserve would depend on the nature of the interruption--i.e., the likely length of the cutoff and the need to minimize adverse economic impacts. Finally, a large shortage (e.g., greater than 6 percent) would probably result in a recommendation to use the reserve. FEA's current analysis indicates that a sudden reduction of this magnitude would have to be offset by the reserve to avoid significant losses in GNP and employment.

Within 10 days after a disruption is announced or becomes apparent, or within 10 days after an interruption in excess of 2 percent of consumption occurs, FEA will make a recommendation to the President concerning use of the reserve. In addition, FEA will submit weekly status reports to the President during a supply interruption in excess of 2 percent of consumption.

DRAWDOWN STRATEGY

The nation will be most vulnerable to an interruption during the early years of the program--i.e., before the entire SPR is in place. If it were not prudently managed, the ESR could be exhausted in a relatively short time. During this period, if the nation were to suffer a serious supply interruption, demand restraint measures must accompany a carefully limited drawdown of the ESR. Once the ESR is activated, FEA will monitor and adjust the drawdown rate. This rate will be determined by the amount of petroleum

in the reserve, the origin and size of the shortfall,¹ the likely duration of the disruption, the amount and timing of attainable demand reduction, and the GNP and employment implications of alternate drawdown rates.²

The initial ESR drawdown rate would be fairly high because of the time lag in realizing savings in demand restraint measures.³ However, if the interruption continued, the drawdown rate would have to be curtailed, even if demand restraint measures did not succeed, to cushion the adjustment on the part of end-users to lower consumption levels, while minimizing employment and GNP losses and inconvenience to the public. If the total consumption rate had to be lowered, demand restraints and reserve drawdowns would be progressively tightened, as required.

- ¹ The size of the shortfall will be determined by the direct interruption experienced and by the operation of the International Energy Program (IEP). The emergency provisions of the IEP are designed so that the burden of an interruption (a decrease greater than 7 percent of consumption in one or more participating countries) will be shared among the participating countries. Operation of the IEP could influence the impact of an import interruption upon the U.S. (increasing it if other countries were proportionally more severely affected and decreasing it if only the U.S. were interrupted) but it would not limit the use of the SPR because use of reserves in excess of agreed levels (currently 70 days of imports (is in the discretion of each country. Since industry working inventories qualify a reserves under IEP rules, the U.S. already has approximately 120 days' supply at existing import levels for IEP purposes. Working inventories cannot be reduced, however, without impairing supply and distribution operations.
- ² FEA is developing a cost/benefit model to estimate the effects on the economy of various levels of shortage, storage withdrawal, and demand restraints. This model will enable FEA to monitor, integrate, and interpret the factors that must be weighed to arrive at the most efficient consumption and drawdown rates during an import disruption.
- ³ FEA analysis has indicated that currently available demand restraint measures are not likely to reduce demand by more than 1 million barrels a day, 200,000 to 300,000 barrels of which would be motor gasoline. Further lowering of the demand probably could be accomplished only through severe, mandatory demand restraint measures that would probably involve gasoline rationing and a mandatory refinery yield program to limit gasoline production.

Industry can usually make adjustments to the first shortage increment, with little loss in production, by eliminating inefficient or optional practices. Adjusting to subsequent increments of supply reduction will be more difficult. As the petroleum shortage increases, industry's ability to maintain production and employment levels by modifying internal processes decreases.

Given the fact that the GNP loss increases at a much greater rate than petroleum consumption declines, it is desirable to level out the consumption reduction to the extent possible during a supply interruption, to minimize resulting economic disruptions. But the advantage of evening out the availability of oil will have to be weighed against the uncertainty of duration of the supply shortage. Because of this uncertainty, any strategy chosen will have to be a flance between drawing down enough reserves to limit employment and production losses in the short term, and promptly instituting sufficient demand restraints so that the reserve could be used at a more uniform rate over a long period of time. FEA will develop a dynamic strategy that will tend toward greater initial use of reserves and subsequent reduction in use as the shortage continues. This strategy will allow the economy and the public to adjust to new lower energy-use patterns as the reserve declines.

ALLOCATION

The recent extension of the Emergency Petroleum Allocation Act of 1973 provided for a conversion of price and allocation controls to standby authorities, which will remain available until 1981 to help meet a supply shortage of sufficient severity to require use of the reserve. FEA expects use of the reserve would tend neither to increase nor to decrease average prices.

The regulations for any allocation program would be those in effect under Section 4 of the Emergency Petroleum Allocation Act of 1973 or similar regulations introduced as a result of the emergency.

DISTRIBUTION

In studying how the drawdown from the ESR and the SPR would be distributed, the FEA identified the eight storage areas listed below:

<u>Storage Area</u>	<u>Petroleum Markets Comprising the Storage Area</u>
1. East Coast	Northeast Atlantic
2. Capline-St. James	St. James
3. Texoma-Port Neches	Port Neches
4. Freeport-Seaway	Freeport
5. Downstream Midwest	Northern Inland Southern Inland Central
6. West Coast	Contiguous West Coast
7. Noncontiguous	Caribbean Noncontiguous West Coast
8. Offshore	

Figure VI-1 shows a map of these areas, each of which contains major existing distribution facilities (see Figure VI-2). For example, the Capline-St. James area contains ports along the Mississippi River, such as St. James and New Orleans, and is the point of origin of the Capline Pipeline.

An important requirement for selection of the initial sites for conversion of salt domes and mines will be their accessibility to the major pipelines that deliver crude oil to inland refineries -- Capline, Texoma, and Seaway. Equally important will be the availability of port facilities for unloading and loading of ships, including the possible use of barges for lightering ships or for movements to other Gulf ports.

It is essential to the success of the program that the ability to move reserve crude to refineries and products to consuming markets be assured. Storage sites and the substitution of crude oil for products cannot be determined solely on the basis of the lowest cost for facilities without regard for the effective operation of the reserve during a severe supply interruption.

Thus, based on projected petroleum market needs, site availability, and access to distribution facilities, storage sites in only the first 5 storage areas are being considered in the ESR. Because the Virgin Islands and Puerto Rico have ready access to reserve crude stored in the Gulf, there will be no need for costly tank storage on those islands. The elements of the analysis however are complex, and many decisions cannot yet be made. For example, no decision can be made at this time concerning storage for Alaska, Hawaii and Guam due to significant production and refining uncertainties. These concern future production of oil from Prudhoe Bay, Alaska, the Gulf of Alaska, and NPR-1, as well as whether new refineries will be built that could service Hawaii, Alaska and the West Coast.

Preliminary analysis indicates, however, that even if no idle shipping capacity existed prior to a supply interruption, there would be sufficient international capacity to move the petroleum from storage to refineries and to markets. American ships and ships from friendly nations would be idled by the supply interruption, and the average round-trip times for tankers carrying reserve crude would be considerably less than round-trip times for tankers carrying imports. (See Table VI-3 and VI-4). Use of foreign flag vessels for transport between U.S. ports would, however, require a waiver of Jones Act provisions.

Moreover, transit times would be greatly reduced compared with shipments from producing countries, such as 50 days the round-trip time from the Middle East via the Suez Canal. (See Figure VI-1). By comparison, round-trip transit times from Gulf Coast storage sites would be approximately 14 days to Atlantic ports and six days to the Caribbean. A Gulf-to-East Coast movement of crude would thus require less than one-third of the ship tonnage now required for Middle East-to-East Coast shipments. For Gulf-to-Caribbean movements, less than one-eighth of the tonnage for Middle East shipments would be required. Movements from the Caribbean to the East Coast would continue at the same or lower levels as before a supply interruption.

Although shipments from the Gulf would require shallow draft vessels or lightering to deep draft ships, the reduction in tonnage requirements, combined with the lower level of consumption that would be enforced during a severe shortage, support the preliminary conclusion that shipping capacity would be available and permit at least major reliance on storage in low-cost salt domes and mines in the Gulf.

Sites for ESR storage will be designed with connections to ports and existing pipelines so that interrupted crude imports can be replaced from storage to the extent provided by a drawdown and allocation plan in effect at the time.

Despite this preliminary indication, the factors in the distribution analysis are complex. Detailed analysis of shipping requirements and capabilities under various supply interruption conditions is continuing and will be discussed extensively in the December 1976 report to Congress. The ESR plan reported here covers only the early implementation of plans in areas where there is no significant question about their inclusion in the final SPR program.

Figure VI-1

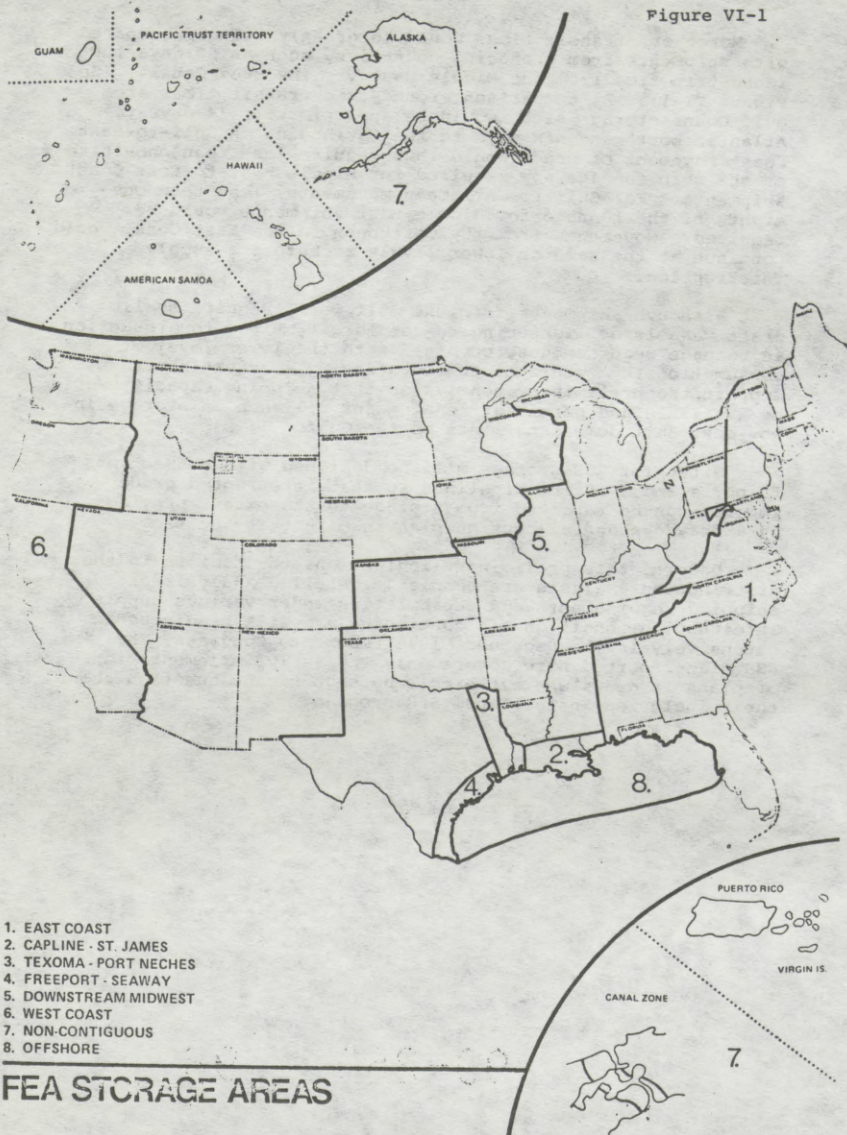


Figure VI-2

TRANSPORTATION FACILITIES WITHIN STORAGE AREAS

Area	Pipelines	Ports	Waterways
1. Freeport-Seaway	Seaway 36" Humble 16" Phillips	Freeport Texas City Corpus Christi Galveston Houston Sea Dock	Houston Shipping Lane Intracoastal Waterway
2. Texoma-Port Neches	Texoma 26" Texas 22" Cities Service	Port Neches Orange Port Arthur Beaumont Lake Charles	Lake Charles Shipping Canal Intracoastal Waterway
3. Capline-St. James	Capline 40" Humble 2-16" Texas 22" Shell 16"	St. James Donaldsonville San Gabriel Hahnville New Orleans Sulphur Venice Pilottown Plaquemine Loop Meraux Norco Convent	Mississippi River Intracoastal Waterway
4. Downstream Midwest	Mid Valley 22" Ashland 24" Capline 40" Ozark 22" Shell 10" Texaco-Cities Service Mobile 20" Amoco 8", 2-12", 20" Arco 22" Chicap 26"		

(Cont.)

Area	Pipelines	Ports	Waterways
5. East Coast		Portsmouth, NH New York, NY Buffalo, NY Dover, NJ Linden, NJ Newark, NJ Paulsboro, NJ Perth Amboy, NJ Port Reading, NJ Westville, NJ Chester, PA Marcus Hook, PA Philadelphia, PA Delaware City, DE Wilmington, DE Baltimore, MD Newport News, VA Yorktown, VA Savannah, GA Pensacola, FL	
6. West Coast		Benicia, CA El Segunda, CA Long Beach, CA Los Angeles, CA Martinez, CA Paramount, CA Richmond, CA San Francisco, CA San Pedro, CA Wilmington, CA Portland, OR Anacortes, WA Bellingham, WA Ferndale, WA Tacoma, WA	
7. Non-Contiguous		Pearl Harbor, HA Barbers Point, HA Honolulu, HA Ponce, PR St. Croix, VI	
8. Offshore		Dedicated Single Point Mooring	

Figure VI-3

ROUND TRIP TANKER TRANSIT TIMES
(Under Normal Supply Conditions)

<u>Origin</u>	<u>Destination (Petroleum Market)</u>	<u>Round Trip ¹ Transit Time</u>
Middle East (Via the Suez Canal)	Atlantic Caribbean Port Neches St. James Freeport	50 days
Middle East (Via the Cape of Good Hope)	Atlantic Caribbean Port Neches St. James Freeport	68 days
West Africa	Atlantic Caribbean Port Neches St. James Freeport	31 days
South America (Venezuela)	Atlantic Caribbean Port Neches St. James Freeport	18 days
Indonesia	Atlantic Caribbean Port Neches St. James Freeport	80 days

¹ Includes loading and discharge time totaling 4 days. Assumes a steaming rate of 15 knots.



VII. ENVIRONMENTAL AND ECONOMIC IMPACTS

The Energy Policy and Conservation Act requires that the ESR Plan contain certain analytical elements, including (1) a comprehensive environmental assessment; (2) an evaluation of the market impacts of developing the reserve, taking into account the availability and the price of supplies and equipment and the effect, if any, on domestic production of acquiring such supplies and equipment for the reserve; (3) any fluctuation in world and domestic market prices for petroleum products that may result from the acquisition of substantial quantities of petroleum products for the reserve; (4) the extent to which such acquisition may support otherwise declining market prices for such products; and (5) the extent to which such acquisition will effect competition in the petroleum industry.

All of these issues are discussed in the following two sections. The first presents an environmental assessment of the ESR program. The second, covering aggregate economic impacts, describes the potential impacts on international trade, employment expenditures and inflation.

ENVIRONMENTAL IMPACTS

A substantial portion of the ESR will be stored in existing solution-mined salt caverns in salt domes and conventional mines in salt and limestone. But if, for any reason, it becomes impractical to store in existing caverns, it is likely that new solution-mined caverns in salt domes¹ will be used. The potential environmental impacts from each of these three types of storage have been evaluated and the preliminary conclusions² are detailed in this initial section of the chapter.

¹ Because the decision has been made that aboveground tank storage will not be used for the ESR, the potential environmental impacts of surface tank storage have not been evaluated and included in the ESR Plan.

² A draft environmental impact statement will be issued on the program in May of 1976. After a suitable comment period, a final environmental impact statement will be issued in July. Additionally, site-specific environmental impact statements are being prepared for those sites that are candidates for use in the program. These will be issued in draft form beginning in May, and the final statements for those sites selected for use in the program probably will be issued in August.

EXISTING SOLUTION-MINED SALT CAVERNS

The storage of crude oil in existing caverns will require activities that may impact on the environment. These activities are: (1) conversion and preparation of each facility for storage purposes; (2) transportation of oil to and from the storage site; (3) fill and maintenance of the storage facilities; and (4) use of the reserve. The potential impacts associated with these activities are summarized in Figure VII-1 and are more fully discussed below.

Facility Conversion and Preparation

Conversion and preparation of the facility will involve the construction of on-site support facilities and small feeder pipelines to the central distribution network. It may also involve a limited amount of leaching to modify the shape or size of the underground cavern and thus require the disposal of the brine generated in the process. However, extensive modification of the caverns is not anticipated.

Facility conversion and preparation may result in the following types of environmental consequences:

1. Hydrology. The potential impact on water quality and quantity arises from the need to dispose of the brine generated during cavern modification. A discussion of specific impacts is contained in the subsection on "Filling and Maintenance," on page VII-7.

2. Biology. The conversion of each cavern will require 1 to 2 years of construction. This activity will create noise and disturbances by humans that will cause larger animals to avoid the area and seek new habitats nearby. If suitable habitats are not present or if resident populations have saturated the area, animal populations in that area will decline. This impact, which could occur to some extent at every site, will not severely damage the region as a whole since the area involved is small in comparison with the available wildlife habitat.

3. Air Quality. During the required construction period, the quality of the air around the site will be affected by the generation of dust, which is typical of

construction activity. The quantity of these emissions will vary from site-to-site, depending on the ground cover, amount of construction, and local meteorological conditions. These emissions will last only through the construction period (1 to 2 years) and may be effectively controlled with the regular wetting of the construction site.

4. Noise. The construction activity will also generate noise, which may have an impact on wildlife habitat in the immediate vicinity. The noise source will be primarily machinery. Although noise emissions from construction equipment could interfere with outdoor human activity 1,500 feet from the site, they can be effectively reduced by acoustical treatment of engines and motors and the use of mufflers.

5. Land Use. Land-use patterns will not be greatly affected since existing caverns will be used. Expansion of refineries, petrochemical plants, or associated commercial and economic development is not expected to occur in adjacent areas, since this type of development is not associated with the storage program. The need to construct additional support facilities (e.g., brine injection wells, pipelines, terminals, and docks) would intensify the use of a small amount of industrial land, however. In addition, a pipeline right-of-way may be required if existing easements or rights-of-way are not available.

6. Employment. Existing salt dome caverns to be converted for the ESR program range in capacity from approximately 15 million barrels to 90 million barrels. The small domes will require approximately 16 workers for 3 months for drilling and 30 workers for 1 year for construction. The larger domes will employ workers for drilling and construction. These two activities can proceed concurrently, and the maximum construction employment on any single dome could exceed one hundred workers. Skilled personnel are required for these activities and there appears to be an ample supply of appropriately skilled labor in the vicinity of the candidate storage sites.

Conversion of the existing salt caverns will also stimulate secondary construction employment effects associated with the provision of services to construction workers and the manufacture of equipment and supplies.

On the largest salt dome storage facility (90 million barrels), the secondary construction employment is expected to reach 539. The total direct and secondary construction employment for the ESR has been estimated at 4,300, spread throughout the Gulf region. It is very likely that all of this employment will be provided from the existing Gulf region labor force.

7. Regional Economic Activity. Conversion of existing salt caverns to oil storage facilities will affect the regional economy. In some cases, the effects will spread beyond regional boundaries, depending largely on where equipment and supplies are purchased. However, since most of the materials needed during construction are manufactured in the Gulf region, most of the economic effects will be confined to this area.

The direct expenditure associated with the conversion of a 90-million-barrel storage facility is expected to be \$24.7 million per year. The regional economic impact of this expenditure would be about \$69.4 million per year. The total increase in personal income resulting from both direct and secondary construction is estimated at \$18.8 million.

8. Taxes. Tax revenues generated by the conversion of salt domes will include the direct taxes paid as part of the project (e.g., sales and excise taxes) and indirect taxes from the household income generated (e.g., property and income tax). The yearly tax revenue resulting from the conversion of a 90-million-barrel facility would be small: federal, \$4.94 million; state, \$0.55 million; and local, \$0.012 million. These figures do not include any tax on the value of the facility itself or the land associated with it. The amount of property tax paid locally will depend on whether the government owns or leases the property and its related facilities. With government ownership, local property taxes would decline by the amount formerly paid on the land; under partial or complete private ownership, local tax revenues would increase.

9. Public Safety. The risk to public safety associated with the existence and development of caverns is minimal. Fire and explosion are unlikely because of the general lack of oxygen in the cavern. The

risk of damage to the cavern from natural phenomena is minimal since the cavern is underground. Only a small amount of operating equipment is required aboveground; therefore, risks stemming from normal construction activities are minimal.

Transportation To/From the Sites

Transportation of the oil to and from the storage caverns could result in the following types of environmental consequences:

1. Hydrology. The potential impact on water quality arises from three sources: (a) dredging that may be required to enlarge the Gulf Coast port facilities that will be used in the program; (b) oil spills that may occur during vessel collisions brought about because of increased traffic of petroleum-carrying ships; and (c) the need to dispose of oily ballast.

Unless otherwise adequately controlled, the environmental effects of dredging can be significant. A large portion of the physical, chemical, and biological pollutants discharged into waterways end up as bottom deposits. Dredging resuspends and redeposits these materials, which can be temporarily harmful if they contain unusually large amounts of pesticides or other organics, radionuclides, heavy metals, or viruses. Specifically, problems can arise when bottom materials are made up of large quantities of unoxidized or partially oxidized organic material where deposits have high percentages of petroleum or petrochemical derivatives or where high nutrient levels exist in the bottom deposits because these materials require large amounts of oxygen from the water for oxidation. Bottom materials of no commercial value may be used for fill in salt marsh lands. This practice can degrade water quality in the vicinity of the disposal site and reduce the productivity of the marsh lands. However, the fill may provide additional land.

To minimize the adverse impacts associated with any required dredging, all safeguards and procedures necessary to obtain a permit from the Army Corps of Engineers will be implemented. The Corps applies criteria established by the U.S. Environmental Protection Agency (EPA) in ruling on permit applications. Discharge of polluted material in the ocean will not be permitted if evidence exists that the proposed disposal might have an unacceptable adverse impact on municipal water supplies, shellfish beds, wildlife, fisheries, or recreational areas. For specific pollutants (heavy metals, nitrates, total organic carbon, and others, EPA's standards require that the resulting concentration

not exceed 1.5 times that of the receiving waters. It is common for the Corps to require monitoring as a condition of the permit.

Potential consequences of oil spills will be minimized through strict adherence to the spill-prevention techniques required by the Federal Water Pollution Control Act Amendments, and through the development of oil-spill contingency plans to contain and recover spilled oil effectively.

The need to dispose of oily ballast will arise when the ships used to transport the oil from the storage site to the refinery arrive at the dock. These ships would have taken on a relatively small amount of sea water as ballast when they were last emptied of oil. That water must be removed and disposed of before the stored oil can be loaded. Since the ballast will contain a small amount of suspended oil, adequate treatment facilities, including surge tanks, will be required at each of the docks used when transporting the oil from storage. Properly treated ballast can then be disposed of in the Gulf.

2. Biology. Both dredging and oil spills could impact on the biological environment. Dredging removes the substrata on which some fauna critical to the food chain depend. The resuspension of sediments can increase the turbidity in the vicinity of the dredging operations to a point where light penetration is reduced and photosynthesis and species production temporarily decrease. The redeposition of the suspended sediments could also bury highly productive grass flats or oyster reefs unless the deposition site is carefully defined. In addition, dredging which connects waterways may change salinity levels in waterways and adjacent marshlands, with potentially adverse effects on local species and habitats.

Those organisms most severely affected by a major oil spill are water birds. Plankton also appear to be quite sensitive to oil pollution. Bottom organisms are affected primarily by the deposition of oily bottom sludges. However, repopulation by benthic organisms is, in many cases, surprisingly rapid. Fish appear to be able to avoid serious damage simply by moving away. However, since the presence of small quantities of dissolved petroleum compounds might possibly interfere with normal migratory movements of fish, a major spill might have immediate consequences for fisheries.

These biological impacts would be minimized through the implementation of those control measures outlined in the above discussion on hydrology.

Filling and Maintenance

This activity involves filling the storage caverns with oil, thus displacing the brine currently there, and performing the tasks required to ensure that the storage site is properly maintained and secured. These activities could result in the following types of environmental consequences:

1. Hydrology. The potential impact on water quality and quantity arises from brine disposal. It is anticipated that some of the brine now in the existing caverns (or which would be generated in any limited cavern-modification effort) will be used by chemical plants as feedstock thus, would not result in an environmental impact. Any brine not so used would be disposed of by deep well injection into a saline aquifer. This is a long-established practice used by the petroleum industry in the Gulf Coast region.

Multiple, large saline aquifers exist in the Gulf Coast region, with ample capacity for underground injection of the quantities of brine contemplated. However, there are physical limitations to the rate at which brine can be injected into a well. To achieve the necessary injection rates without fracturing geologic strata that contain fresh water, brine is customarily disposed of in multiple wells at a rate of 1,000 gallons or less per minute. Therefore, the number of disposal wells that would need to be drilled for a particular site would depend on the capacity of the cavern. Moreover, these brine injection wells have to be spaced around the cavern surface so that they will not interfere with one another. Brine injection could force saline water into fresh water aquifers by fracturing the rock formation or migration along existing fractures or fault zones, and increase the surface discharge from saline springs. In addition, during injection, the brine must be maintained in an oxygen-free atmosphere to prevent the growth of bacteria that could cause the formation of metal oxide precipitates, which, in turn, could clog the wells. These consequences can probably be avoided through proper well design, construction, and operation.

2. Noise. Displacing brine with oil will generate noise that may have an impact on wildlife habitats in the immediate vicinity. The noise source will be the operation

of pumps and electric motors and could have an impact on human activity up to 3,500 feet from the site. These noise emissions can be substantially reduced through acoustical treatment, such as insulation.

3. Employment. The operations staff of each salt dome storage facility will consist of only 20 to 25 workers, who will perform the necessary security and maintenance functions. The 25 operations and maintenance personnel at a 90-million-barrel salt dome storage facility would generate employment for an additional 22 workers, resulting in a total employment impact of 47 persons.

4. Regional Economic Activity. The operation and maintenance of a salt dome storage facility would have a small impact on the regional economy. For a 90-million-barrel facility, this could amount to \$2.34 million per year.

Use of the Reserve

Should a supply interruption occur and the ESR be activated, the stored reserve would be removed from the caverns by displacing the oil with water. This activity could result in the following types of environmental consequences:

1. Hydrology. Because of the large volumes involved, nearly all of the required water will be drawn from surface water sources rather than from groundwater. Groundwater will be used only when the resultant brine in the cavern can be cycled to chemical plants and when the available surface water does not meet the water-quality standards for chemical plant feedstock brine. However, where brine is not cycled to a chemical plant and large volumes of water are required to displace the oil, surface water might be obtained from the Gulf of Mexico, the Mississippi River, or other nearby bodies of water.

Furthermore, the multiple fillings and withdrawals from using the reserve could create the need for brine treatment facilities. The brine displaced during second and subsequent fillings would contain small amounts of suspended oil that would need to be removed before the brine could be used as chemical plant feedstock. However, no treatment is anticipated for that portion of the brine that may undergo injection-well disposal, inasmuch as the injection salaquifers will remain completely isolated from the surrounding biosphere.

2. Geology. If it became necessary to use groundwater to some degree, some subsidence could occur in the areas of groundwater withdrawal. The amount would depend principally on the decline in hydrostatic pressure and the amount of clay present in the lithic sequence affected by the decline. Furthermore, the timeframe for this subsidence would depend on the thickness and hydraulic character of the clay beds, which undergo compaction. This effect can be minimized through careful selection of the aquifers and the rates of withdrawal.

In addition, some geological impact may result from multiple fillings and withdrawals of the caverns. Each time the cavern is emptied of oil through water displacement additional leaching occurs, thereby increasing the volume of the cavern. The stability (i.e., susceptibility to cavern shrinkage or salt "creep") of an individual cavern depends in large measure on the cavern size and shape and the mass of the salt dome and the overburden. As a cavern's size increases because of oil/water cycling, the phenomenon of salt "creep" toward an equilibrium state of stress may be manifested by very slight subsidence and by a change in the shape of the cavern. However, sufficient knowledge of technology and operating experience with construction of salt caverns, specifically concurrent fill and leaching, are available to control these factors, and to ensure stability of the projected cavern configurations.

3. Biology. The impingement and entrainment of aquatic biota will be unavoidable when using water from the Gulf of Mexico. However, the impact will be minimized by designing intake rates to conform to environmental restrictions that require intake velocities of less than 0.5 feet per second. Furthermore, the intake valves can be positioned sufficiently far from the shore so that estuaries are avoided; thus fewer biota are affected.

4. Noise. The displacement of the oil with water will generate noise that may have an impact on wildlife habitats in the immediate vicinity. These impacts are discussed in detail in the subject on noise under "Filling and Maintenance," on page VII.

EXISTING MINES

Part of the ESR will probably be stored in existing mines. The sites under consideration include both operating and abandoned mines and are located in various types of geological formations, including rock salt.

In general, fewer potential environmental consequences are associated with storing oil in existing mines than with solution-mined salt caverns. Those consequences include:

1. Geology. Although an underground location is less susceptible to earthquake damage than an aboveground structure, the remote hazard of facility failure from seismic disturbances does exist in the case of mines in rock formations. This hazard can be essentially eliminated by selecting mines in zones of seismic quiescence. Because of the inherent stability of salt domes, there is virtually no risk of earthquake damage to the salt mines under consideration.

2. Hydrology. The water-related impacts of existing-mine use are, in all cases, substantially less than those of solution-cavern use. Substantial amounts of water will not be needed to displace the oil when cycling the reserve because the oil would be pumped out with surface-powered pumps. In addition, since the mines will be empty before filling, there will be no brine to dispose of. However, the one water-related impact to be addressed is the seepage of groundwater from surrounding rock formations where some permeability exists in the host rock. In such mines, the outflow of oil will be prevented by maintaining either natural or artificial hydraulic gradients so that the hydrostatic pressures in the host rock are higher than the internal pressure of the oil. This method of containment results in seepage of groundwater into the storage cavern. This water and the intentionally provided waterbed below the oil must be removed and treated during both conversion and operation of the facility. The various pollutants that contaminate this water must be removed if the effluent is to be environmentally acceptable. Treatment options include existing refinery and municipal wastewater treatment facilities, if they are easily accessible to the storage sites. Where no such facilities are available, on-site package treatment facilities will be provided.

3. Biology. The impact of mine storage on animal habitat should be somewhat less than the impact of solution-mine salt caverns for, although the disturbance created by the construction should be comparable, the nature of the activity and its duration will be significantly less. Further, the impact of converting abandoned mines should be substantially less than that of converting operating mines because less construction will be required over a shorter period, and even less area will be needed for the facility.

4. Air Quality. The fugitive-dust problem associated with the conversion and operation of solution-mined salt caverns is applicable here as well, except that the effects will be substantially less for abandoned mines because of the lower level of required activity.

5. Noise. The level of noise generated by the construction phase of converting operating mines will depend largely on the extent of the construction required, although the area of influence should not exceed that for salt caverns (i.e., 1,500 feet from the site). The noise generated by abandoned-mine conversion should be substantially less. Cycling the oil will require large pumps similar to those used for displacing the oil in salt caverns, but the distance at which noise emissions will impact on human activity should be less for a particular site than the projected 3,500 feet for salt caverns because fewer pumps and motors will be required.

6. Land Use. Land-use impacts will, in general, be less for converting existing mines than for converting existing solution-mined salt caverns since no land is required for the construction of injection wells. In the case of converting operating mines, which involves the relocation of mining operations, some land will be required to construct new access shafts and possibly relocate surface facilities for the new mine. Land for the new mine and facilities could require from 10 to 50 or more acres. Abandoned mines will require only a few acres around the access shafts to locate the surface facilities associated with the storage site. Depending on the distribution system of each mine, a pipeline right-of-way may be required.

7. Employment. The number of workers required to convert an underground mine to an oil storage facility will vary, depending on the size and condition of the mine. A 90-million-barrel operating mine would probably employ about 120 workmen for conversion and relocation of existing mining activities. Another 792 persons would be employed as an indirect consequence of the project, to provide services to the construction workers or to manufacture equipment and supplies. Thus, an estimated 902 persons would be employed directly or indirectly as a result of storing 90 million barrels of oil in an existing mine.

A second potential employment impact associated with converting an operating mine involves the work force of the mine. If the mining operation were to cease, the

workers would have to find other jobs. If the mine were relocated, the workers could be employed initially for conversion and relocation, and subsequently, in the relocated mining operation.

8. Regional Economic Activity. Conversion of an existing mine to an oil storage facility would have a small impact on the regional economy. The total direct expenditure of \$9.52 million per year required for a 90-million-barrel facility would result in a regional economic impact of \$26.7 million per year. This economic effect translates into a total increase in personal income of \$7.23 million per year.

9. Taxes. The revenues generated by the project will result from the taxes paid in the course of doing business (e.g., excise and sales taxes) and from increased household income (income taxes and sales or property taxes resulting from increased household spending). Thus, the yearly taxes associated with this storage alternative are very low: federal, \$1.90 million; state, \$0.21 million; local, \$0.09 million.

It is expected that the Federal Government will own all storage facilities in existing mines, making these properties exempt from local taxes. However, if the current owner were relocated, the new mine would contribute to the local tax base, offsetting the loss of revenues from the old mine.

NEW SOLUTION-MINED SALT CAVERNS

Should it become necessary to develop new solution-mined salt caverns to store part of the ESR, only facility construction and preparation would differ significantly from the same activity in converting and using existing solution-mined salt caverns. Specifically, constructing and preparing new solution-mined salt caverns could have the following types of environmental consequences:

1. Hydrology. The development of new salt caverns by solution mining requires both the use and the disposal of much larger quantities of water than required in the conversion and preparation of existing caverns. It is anticipated that this water could be obtained primarily from the Gulf of Mexico, and that the brine produced by the mining operation would be disposed of in the Gulf. Should the technique of concurrent leaching and filling be used, the resultant brine might include a small amount of

suspended oil and would therefore require treatment (separation) prior to disposal. Treatment of brine, other than for oil suspension, is not anticipated at this time, based on known compositions of Gulf Coast salt domes. If industry created the new solution-mined caverns, they might use, after treatment, some of the brine in their chemical plants, thereby reducing disposal problems.

Disposing of the brine in the Gulf of Mexico would increase salinity concentration in the area of the diffuser. The size of the affected area would depend on the rate at which the brine was disposed. For purposes of studying the potential impact, a "worst-case" analysis was conducted. The results show that, if a new cavern development produced brine at a rate of 42,000 gallons per minute and this brine were deposited in the Gulf at a velocity of 3 feet per second, detectable change might occur over 2,076 acres. Behavioral changes (primarily avoidance) in mobile species and possible death in sessile species might be encountered in a much smaller area--e.g., about 226 acres. Placing the diffuser at a sufficient distance from the shore and positioning it to avoid banks, reefs, and tidal inlets would restrict the adverse impact to the immediate vicinity of the diffuser.

2. Land Use. The impact on land use would be greater for new solution-mined caverns than for existing ones because, except for petroleum production, no part of the land on or near the salt dome would have been developed previously. It is estimated that a maximum surface area of 260 acres would be required for each site. All surface and other support facilities would have to be constructed, although the impacts associated with this construction would be minor. The most significant impact would be the use of existing roads or construction of new roads for movement of equipment to and from the site, and the construction of new pipelines to connect the storage site with existing transportation systems. Land-use activities such as housing would be limited to outside the boundary lines.

3. Employment. Approximately 150 persons would be employed for 3 to 5 years to construct a new solution-mined salt cavern with a capacity of 200 million barrels. This construction activity would generate secondary employment of 1,277 persons in the service and manufacturing sectors. Most of this impact would be felt in the Gulf region where there is ample labor and materials manufacturing to carry out this program.

4. Regional Economic Activity. Construction of a new solution-mined storage facility would have a much greater impact on the regional economy than conversion of existing facilities would. Depending on the direct expenditure required, the regional economic impact could range from \$48.3 million to \$155.0 million per year. This translates into an annual increase in personal income of \$13.1 million to \$42.0 million.

5. Time-related impacts. Conversion of existing caverns will require 1 to 2 years while construction of new caverns would require 3 to 5 years. Certain conditions which could develop potential impacts discussed under existing caverns above will have the same impact for new caverns if they are considered on a per unit-of-time basis. However, since new caverns will take longer to develop, related impacts are expected to be more significant, with respect to time, than for conversion of existing caverns. The types of impacts are discussed in the existing cavern discussion (biology, air quality, and noise).

MARKET IMPACTS

AGGREGATE ECONOMIC IMPACTS

Implementation of the ESR Plan is not expected to result in significant impacts to the nation's economy, according to preliminary analyses conducted within the FEA. A brief summary of these conclusions as they relate to international trade, the GNP, inflation, the federal budget, petroleum markets, and the petroleum industry is presented below.

International Trade

The Early Storage Reserve will result in increased imports about equal in volume to the amount stored, because the oil removed from the market and stored would be replaced by increased imports. This will increase total annual imports by about \$1 billion in both FY 77 (starting about January 1977) and FY 78. This increase is approximately 1 percent of the annual imports of all goods and services and less than 0.1 percent of the GNP. Experience with increased foreign exchange payments for oil since 1973 have indicated that they are likely to merge with other international trade adjustments and tend to contribute to counterbalancing increases in U.S. exports or capital inflows.

Employment, Expenditures and GNP

In general, the effect on national employment and GNP will be positive but not significant, although the impact on the immediate locality where storage facilities are located may be appreciable as noted in the regional economic impacts discussions.

Specific effects of the ESR program on aggregate national employment and GNP will depend on the condition of markets for relevant labor categories and materials during the period of engineering construction and fill. To the extent that there is under-employment in the relevant engineering, construction and equipment categories, the program will tend to add to employment and production in those sectors. This result will also depend on there being no significant capacity limitations on the supply of materials and equipment for use in the program. On the other hand, if the general availability of labor or materials is limited or if the program is financed by cutting back other spending programs, it will divert resources from other uses and not add to employment or GNP. It appears, at present, that availability of some skilled labor categories, such as field welders, may be limited, but this would not prevent achievement of the planned schedule. No serious limitations on most materials are anticipated.

Apart from oil acquisition, most of the program's cost will be for engineering and construction connected with storage facilities. The labor required will be negligible in relation to the national labor force, even in the critical skill categories. It is expected that expenditures for facilities will have little effect in a context of total national fixed investment in the range of \$200 billion per year.

Inflationary Impact

The President's FY 77 budget projections show unemployment continuing at high rates throughout the ESR period. Therefore, the ESR will place no significant pressure on the total labor market but will have a positive, though small, effect on employment if other programs are not reduced. There might be small inflationary pressures on highly specialized labor categories (e.g., oil-field welders) in which there is currently no unemployment. The program will use significant amounts of oil-field pipe and equipment, which are not expected to be in short supply.

The program will not affect the productivity or structural character of the oil importing and refining industries. The direct price effects as a result of the 150 million barrel ESR program would be small. For instance, purchase at import prices of the 150 million barrels of oil for storage would raise the national average price about 3¢ per barrel or 0.07¢ per gallon. Significant indirect price effects are not anticipated.

FIGURE VII-1
POTENTIAL ENVIRONMENTAL IMPACTS OF SOLUTION CAVERN STORAGE
(EXISTING CAVERNS)

TYPES OF IMPACT ACTIVITY	HYDROLOGY- WATER SUPPLY	GEOLOGY	BIOLOGY	AIR QUALITY	NOISE	LAND USE	EMPLOYMENT	REGIONAL ECONOMIC ACTIVITY	TAXES	PUBLIC SAFETY
Facility Conversion and Preparation	Underground disposal of brine		disturbance and migration of local animal populations	fugitive dust emissions; can be controlled by wetting	disturbance of local residents within 1300'	construction of support facilities for pipelines	maximum of 76 workers per site during construction time for 1-2 years	regional economic impact of \$69.40M per year, per site; regional economic impact of \$18.80M per year per site if sites are owned	small increase in tax revenues, except for property tax revenues	minimal impact
Transportation	dredging effects; disposal of dredge spoil; oil spills; disposal of oily ballast		adverse impacts on aquatic organisms							
Filling and Maintaining	underground disposal of brine				disturbance of local residents within 3300'		small permanent security and maintenance crew	regional economic impact of \$2.34M per year per site		
Using the Reserve	underground disposal of brine	subsidence; change in size and shape of cavern	adverse impacts on aquatic organisms		disturbance of local residents within 3300'					

APPENDIX A

LEGISLATION

The Energy Policy and Conservation Act of 1975, P.L. 94-163, encompasses several energy and conservation areas. Title I, Part B, pertains to the Strategic Petroleum Reserve. In addition, Sec. 2. Statement of Purposes, and Sec. 3. Definitions are reproduced in this report for easy reference.

STATEMENT OF PURPOSES

42 USC 6201.

SEC. 2. The purposes of this Act are—

- (1) to grant specific standby authority to the President, subject to congressional review, to impose rationing, to reduce demand for energy through the implementation of energy conservation plans, and to fulfill obligations of the United States under the international energy program;
- (2) to provide for the creation of a Strategic Petroleum Reserve capable of reducing the impact of severe energy supply interruptions;
- (3) to increase the supply of fossil fuels in the United States, through price incentives and production requirements;
- (4) to conserve energy supplies through energy conservation programs, and, where necessary, the regulation of certain energy uses;
- (5) to provide for improved energy efficiency of motor vehicles, major appliances, and certain other consumer products;
- (6) to reduce the demand for petroleum products and natural gas through programs designed to provide greater availability and use of this Nation's abundant coal resources; and
- (7) to provide a means for verification of energy data to assure the reliability of energy data.

DEFINITIONS

42 USC 6202.

SEC. 3. As used in this Act:

- (1) The term "Administrator" means the Administrator of the Federal Energy Administration.
- (2) The term "person" includes (A) any individual, (B) any corporation, company, association, firm, partnership, society, trust, joint venture, or joint stock company, and (C) the government and any agency of the United States or any State or political subdivision thereof.
- (3) The term "petroleum product" means crude oil, residual fuel oil, or any refined petroleum product (including any natural liquid and any natural gas liquid product).
- (4) The term "State" means a State, the District of Columbia, Puerto Rico, or any territory or possession of the United States.
- (5) The term "United States" when used in the geographical sense means all of the States and the Outer Continental Shelf.
- (6) The term "Outer Continental Shelf" has the same meaning as such term has under section 2 of the Outer Continental Shelf Lands Act (43 U.S.C. 1331).
- (7) The term "international energy program" means the Agreement on an International Energy Program, signed by the United States on November 18, 1974, including (A) the annex entitled "Emergency Reserves", (B) any amendment to such Agreement which includes another nation as a party to such Agreement, and (C) any technical or clerical amendment to such Agreement.

(8) The term "severe energy supply interruption" means a national energy supply shortage which the President determines—

(A) is, or is likely to be, of significant scope and duration, and of an emergency nature;

(B) may cause major adverse impact on national safety or the national economy; and

(C) results, or is likely to result, from an interruption in the supply of imported petroleum products, or from sabotage or an act of God.

(9) The term "antitrust laws" includes—

(A) the Act entitled "An Act to protect trade and commerce against unlawful restraints and monopolies", approved July 2, 1890 (15 U.S.C. 1, et seq.);

(B) the Act entitled "An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes", approved October 15, 1914 (15 U.S.C. 12, et seq.);

(C) the Federal Trade Commission Act (15 U.S.C. 41, et seq.);

(D) sections 73 and 74 of the Act entitled "An Act to reduce taxation, to provide revenue for the Government, and for other purpose", approved August 27, 1894 (15 U.S.C. 8 and 9); and

(E) the Act of June 19, 1936, chapter 592 (15 U.S.C. 13, 13a, 13b, and 21A).

(10) The term "Federal land" means all lands owned or controlled by the United States, including the Outer Continental Shelf, and any land in which the United States has reserved mineral interests, except lands—

(A) held in trust for Indians or Alaska Natives,

(B) owned by Indians or Alaska Natives with Federal restrictions on the title,

(C) within any area of the National Park System, the National Wildlife Refuge System, the National Wilderness Preservation System, the National System of Trails, or the Wild and Scenic Rivers System, or

(D) within military reservations.

PART B—STRATEGIC PETROLEUM RESERVE

DECLARATION OF POLICY

SEC. 151. (a) The Congress finds that the storage of substantial quantities of petroleum products will diminish the vulnerability of the United States to the effects of a severe energy supply interruption, and provide limited protection from the short-term consequences of interruptions in supplies of petroleum products.

(b) It is hereby declared to be the policy of the United States to provide for the creation of a Strategic Petroleum Reserve for the storage of up to 1 billion barrels of petroleum products, but not less than 150 million barrels of petroleum products by the end of the 3-year period which begins on the date of enactment of this Act, for the purpose of reducing the impact of disruptions in supplies of petroleum products or to carry out obligations of the United States under the international energy program. It is further declared to be the policy of the United States to provide for the creation of an Early Storage Reserve, as part of the Reserve, for the purpose of providing limited protection from the impact of near-term disruptions in supplies of petroleum products or to carry out obligations of the United States under the international energy program.

10 USC 7421
et seq.

42 USC 6231.

DEFINITIONS

42 USC 6232.

SEC. 152. As used in this part:

(1) The term "Early Storage Reserve" means that portion of the Strategic Petroleum Reserve which consists of petroleum products stored pursuant to section 155.

(2) The term "importer" means any person who owns, at the first place of storage, any petroleum product imported into the United States.

(3) The term "Industrial Petroleum Reserve" means that portion of the Strategic Petroleum Reserve which consists of petroleum products owned by importers or refiners and acquired, stored, or maintained pursuant to section 156.

(4) The term "interest in land" means any ownership or possessory right with respect to real property, including ownership in fee, an easement, a leasehold, and any subsurface or mineral rights.

(5) The term "readily available inventories" means stocks and supplies of petroleum products which can be distributed or used without affecting the ability of the importer or refiner to operate at normal capacity; such term does not include minimum working inventories or other unavailable stocks.

(6) The term "refiner" means any person who owns, operates, or controls the operation of any refinery.

(7) The term "Regional Petroleum Reserve" means that portion of the Strategic Petroleum Reserve which consists of petroleum products stored pursuant to section 157.

(8) The term "related facility" means any necessary appurtenance to a storage facility, including pipelines, roadways, reservoirs, and salt brine lines.

(9) The term "Reserve" means the Strategic Petroleum Reserve.

(10) The term "storage facility" means any facility or geological formation which is capable of storing significant quantities of petroleum products.

(11) The term "Strategic Petroleum Reserve" means petroleum products stored in storage facilities pursuant to this part; such term includes the Industrial Petroleum Reserve, the Early Storage Reserve, and the Regional Petroleum Reserve.

STRATEGIC PETROLEUM RESERVE OFFICE

Establishment,
42 USC 6233.

SEC. 153. There is established, in the Federal Energy Administration, a Strategic Petroleum Reserve Office. The Administrator, acting through such Office and in accordance with this part, shall exercise authority over the establishment, management, and maintenance of the Reserve.

STRATEGIC PETROLEUM RESERVE

42 USC 6234.

SEC. 154. (a) A Strategic Petroleum Reserve for the storage of up to 1 billion barrels of petroleum products shall be created pursuant to this part. By the end of the 3-year period which begins on the date of enactment of this Act, the Strategic Petroleum Reserve (or the Early Storage Reserve authorized by section 155, if no Strategic Petroleum Reserve Plan has become effective pursuant to the provisions of section 159(a)) shall contain not less than 150 million barrels of petroleum products.

(b) The Administrator, not later than December 15, 1976, shall prepare and transmit to the Congress, in accordance with section 551, a

Plan to
Congress.
Pub. P. 965.

Strategic Petroleum Reserve Plan. Such Plan shall comply with the provisions of this section and shall detail the Administrator's proposals for designing, constructing, and filling the storage and related facilities of the Reserve.

(c) (1) To the maximum extent practicable and except to the extent that any change in the storage schedule is justified pursuant to subsection (e) (6), the Strategic Petroleum Reserve Plan shall provide that:

(A) within 7 years after the date of enactment of this Act, the volume of crude oil stored in the Reserve shall equal the total volume of crude oil which was imported into the United States during the base period specified in paragraph (2);

(B) within 18 months after the date of enactment of this Act, the volume of crude oil stored in the Reserve shall equal not less than 10 percent of the goal specified in subparagraph (A);

(C) within 3 years after the date of enactment of this Act, the volume of crude oil stored in the Reserve shall equal not less than 25 percent of the goal specified in subparagraph (A); and

(D) within 5 years after the date of enactment of this Act, the volume of crude oil stored in the Reserve shall equal not less than 65 percent of the goal specified in subparagraph (A).

Volumes of crude oil initially stored in the Early Storage Reserve and volumes of crude oil stored in the Industrial Petroleum Reserve, and the Regional Petroleum Reserve shall be credited toward attainment of the storage goals specified in this subsection.

(2) The base period shall be the period of the 3 consecutive months, during the 24-month period preceding the date of enactment of this Act, in which average monthly import levels were the highest.

(d) The Strategic Petroleum Reserve Plan shall be designed to assure, to the maximum extent practicable, that the Reserve will minimize the impact of any interruption or reduction in imports of refined petroleum products and residual fuel oil in any region which the Administrator determines is, or is likely to become, dependent upon such imports for a substantial portion of the total energy requirements of such region. The Strategic Petroleum Reserve Plan shall be designed to assure, to the maximum extent practicable, that each noncontiguous area of the United States which does not have overland access to domestic crude oil production has its component of the Strategic Petroleum Reserve within its respective territory.

(e) The Strategic Petroleum Reserve Plan shall include:

(1) a comprehensive environmental assessment;

(2) a description of the type and proposed location of each storage facility (other than storage facilities of the Industrial Petroleum Reserve) proposed to be included in the Reserve;

(3) a statement as to the proximity of each such storage facility to related facilities;

(4) an estimate of the volumes and types of petroleum products proposed to be stored in each such storage facility;

(5) a projection as to the aggregate size of the Reserve, including a statement as to the most economically-efficient storage levels for each such storage facility;

(6) a justification for any changes, with respect to volumes or dates, proposed in the storage schedule specified in subsection (c), and a program schedule for overall development and completion of the Reserve (taking into account all relevant factors, including cost effectiveness, the need to construct related facilities, and the ability to obtain sufficient quantities of petroleum products to fill the storage facilities to the proposed storage levels);

- (7) an estimate of the direct cost of the Reserve, including—
 - (A) the cost of storage facilities;
 - (B) the cost of the petroleum products to be stored;
 - (C) the cost of related facilities; and
 - (D) management and operation costs;
- (8) an evaluation of the impact of developing the Reserve, taking into account—
 - (A) the availability and the price of supplies and equipment and the effect, if any, upon domestic production of acquiring such supplies and equipment for the Reserve;
 - (B) any fluctuations in world, and domestic, market prices for petroleum products which may result from the acquisition of substantial quantities of petroleum products for the Reserve;
 - (C) the extent to which such acquisition may support otherwise declining market prices for such products; and
 - (D) the extent to which such acquisition will affect competition in the petroleum industry;
- (9) an identification of the ownership of each storage and related facility proposed to be included in the Reserve (other than storage and related facilities of the Industrial Petroleum Reserve);
- (10) an identification of the ownership of the petroleum products to be stored in the Reserve in any case where such products are not owned by the United States;
- (11) a statement of the manner in which the provisions of this part relating to the establishment of the Industrial Petroleum Reserve and the Regional Petroleum Reserve will be implemented; and
- (12) a Distribution Plan setting forth the method of drawdown and distribution of the Reserve.

EARLY STORAGE RESERVE

42 USC 6235.

Sec. 155. (a) (1) The Administrator shall establish an Early Storage Reserve as part of the Strategic Petroleum Reserve. The Early Storage Reserve shall be designed to store petroleum products, to the maximum extent practicable, in existing storage capacity. Petroleum products stored in the Early Storage Reserve may be owned by the United States or may be owned by others and stored pursuant to section 156(b).

(2) If the Strategic Petroleum Reserve Plan has not become effective under section 159(a), the Early Storage Reserve shall contain not less than 150 million barrels of petroleum products by the end of the 3-year period which begins on the date of enactment of this Act.

(b) The Early Storage Reserve shall provide for meeting regional needs for residual fuel oil and refined petroleum products in any region which the Administrator determines is, or is likely to become, dependent upon imports of such oil or products for a substantial portion of the total energy requirements of such region.

(c) Within 90 days after the date of enactment of this Act, the Administrator shall prepare and transmit to the Congress an Early Storage Reserve Plan which shall provide for the storage of not less than 150 million barrels of petroleum products by the end of 3 years from the date of enactment of this Act. Such plan shall detail the Administrator's proposals for implementing the Early Storage Reserve requirements of this section. The Early Storage Reserve Plan shall, to the maximum extent practicable, provide for, and set forth

Plan, trans-
mittal to
Congress.

the manner in which, Early Storage Reserve facilities will be incorporated into the Strategic Petroleum Reserve after the Strategic Petroleum Reserve Plan has become effective under section 159(a). The Early Storage Reserve Plan shall include, with respect to the Early Storage Reserve, the same or similar assessments, statements, estimates, evaluations, projections, and other information which section 154(e) requires to be included in the Strategic Petroleum Reserve Plan, including a Distribution Plan for the Early Storage Reserve.

INDUSTRIAL PETROLEUM RESERVE

SEC. 156. (a) The Administrator may establish an Industrial Petroleum Reserve as part of the Strategic Petroleum Reserve.

Establishment,
42 USC 6236.

(b) To implement the Early Storage Reserve Plan or the Strategic Petroleum Reserve Plan which has taken effect pursuant to section 159(a), the Administrator may require each importer of petroleum products and each refiner to (1) acquire, and (2) store and maintain in readily available inventories, petroleum products in amounts determined by the Administrator, except that the Administrator may not require any such importer or refiner to store such petroleum products in an amount greater than 3 percent of the amount imported or refined by such person, as the case may be, during the previous calendar year. Petroleum products imported and stored in the Industrial Petroleum Reserve shall be exempt from any tariff or import license fee.

(c) The Administrator shall implement this section in a manner which is appropriate to the maintenance of an economically sound and competitive petroleum industry. The Administrator shall take such steps as are necessary to avoid inequitable economic impacts on refiners and importers, and he may grant relief to any refiner or importer who would otherwise incur special hardship, inequity, or unfair distribution of burdens as the result of any rule, regulation, or order promulgated under this section. Such relief may include full or partial exemption from any such rule, regulation, or order and the issuance of an order permitting such an importer or refiner to store petroleum products owned by such importer or refiner in surplus storage capacity owned by the United States.

REGIONAL PETROLEUM RESERVE

SEC. 157. (a) The Strategic Petroleum Reserve Plan shall provide for the establishment and maintenance of a Regional Petroleum Reserve in, or readily accessible to, each Federal Energy Administration Region, as defined in title 10, Code of Federal Regulations in effect on November 1, 1975, in which imports of residual fuel oil or any refined petroleum product, during the 24-month period preceding the date of computation, equal more than 20 percent of demand for such oil or product in such regions during such period, as determined by the Administrator. Such volume shall be computed annually.

42 USC 6237.

(b) To implement the Strategic Petroleum Reserve Plan, the Administrator shall accumulate and maintain in or near any such Federal Energy Administration Region described in subsection (a), a Regional Petroleum Reserve containing volumes of such oil or product, described in subsection (a), at a level adequate to provide substantial protection against an interruption or reduction in imports of such oil or product to such region, except that the level of any such Regional Petroleum Reserve shall not exceed the aggregate volume of imports of such oil or product into such region during the period of the 3 consecutive months, during the 24-month period specified in subsection

(a), in which average monthly import levels were the highest, as determined by the Administrator. Such volume shall be computed annually.

(c) The Administrator may place in storage crude oil, residual fuel oil, or any refined petroleum product in substitution for all or part of the volume of residual fuel oil or any refined petroleum product stored in any Regional Petroleum Reserve pursuant to the provisions of this section if he finds that such substitution (1) is necessary or desirable for purposes of economy, efficiency, or for other reasons, and (2) may be made without delaying or otherwise adversely affecting the fulfillment of the purpose of the Regional Petroleum Reserve.

OTHER STORAGE RESERVES

Report to
Congress,
42 USC 6238.

SEC. 158. Within 6 months after the Strategic Petroleum Reserve Plan is transmitted to the Congress, pursuant to the requirements of section 154(b), the Administrator shall prepare and transmit to the Congress a report setting forth his recommendations concerning the necessity for, and feasibility of, establishing—

(1) Utility Reserves containing coal, residual fuel oil, and refined petroleum products, to be established and maintained by major fossil-fuel-fired baseload electric power generating stations;

(2) Coal Reserves to consist of (A) federally-owned coal which is mined by or for the United States from Federal lands, and (B) Federal lands from which coal could be produced with minimum delay; and

(3) Remote Crude Oil and Natural Gas Reserves consisting of crude oil and natural gas to be acquired and stored by the United States, in place, pursuant to a contract or other agreement or arrangement entered into between the United States and persons who discovered such oil or gas in remote areas.

REVIEW BY CONGRESS AND IMPLEMENTATION

42 USC 6239.

SEC. 159. (a) The Strategic Petroleum Reserve Plan shall not become effective and may not be implemented, unless—

(1) the Administrator has transmitted such Plan to the Congress pursuant to section 154(b); and

(2) neither House of Congress has disapproved (or both Houses have approved) such Plan, in accordance with the procedures specified in section 551.

Post, p. 965.

(b) For purposes of congressional review of the Strategic Petroleum Reserve Plan under subsection (a), the 5 calendar days described in section 551(f)(4)(A) shall be lengthened to 15 calendar days, and the 15 calendar days described in section 551(c) and (d) shall be lengthened to 45 calendar days.

(c) The Administrator may, prior to transmittal of the Strategic Petroleum Reserve Plan, prepare and transmit to the Congress proposals for designing, constructing, and filling storage or related facilities. Any such proposal shall be accompanied by a statement explaining (1) the need for action on such proposals prior to completion of such Plan, (2) the anticipated role of the proposed storage or related facilities in such Plan, and (3) to the maximum extent practicable, the same or similar assessments, statements, estimates, evaluations, projections, and other information which section 154(e) requires to be included in the Strategic Petroleum Reserve Plan.

(d) The Administrator may prepare amendments to the Strategic Petroleum Reserve Plan or to the Early Storage Reserve Plan. He shall transmit any such amendment to the Congress together with a

statement explaining the need for such amendment and, to the maximum extent practicable, the same or similar assessments, statements, estimates, evaluations, projections, and other information which section 154(e) requires to be included in the Strategic Petroleum Reserve Plan.

(e) Any proposal transmitted under subsection (c) and any amendment transmitted under subsection (d), other than a technical or clerical amendment or an amendment to the Early Storage Reserve Plan, shall not become effective and may not be implemented unless—

(1) the Administrator has transmitted such proposal or amendment to the Congress in accordance with subsection (c) or (d) (as the case may be), and

(2) neither House of Congress has disapproved (or both Houses of Congress have approved) such proposal or amendment, in accordance with the procedures specified in section 551.

(f) To the extent necessary or appropriate to implement—

(1) the Strategic Petroleum Reserve Plan which has taken effect pursuant to subsection (a);

(2) the Early Storage Reserve Plan;

(3) any proposal described in subsection (c), or any amendment described in subsection (d), which such proposal or amendment has taken effect pursuant to subsection (e); and

(4) any technical or clerical amendment or any amendment to the Early Storage Reserve Plan,

the Administrator may:

(A) promulgate rules, regulations, or orders;

(B) acquire by purchase, condemnation, or otherwise, land or interests in land for the location of storage and related facilities;

(C) construct, purchase, lease, or otherwise acquire storage and related facilities;

(D) use, lease, maintain, sell, or otherwise dispose of storage and related facilities acquired pursuant to this part;

(E) acquire, subject to the provisions of section 160, by purchase, exchange, or otherwise, petroleum products for storage in the Strategic Petroleum Reserve, including the Early Storage Reserve and the Regional Petroleum Reserve;

(F) store petroleum products in storage facilities owned and controlled by the United States or in storage facilities owned by others if such facilities are subject to audit by the United States;

(G) execute any contracts necessary to carry out the provisions of such Strategic Petroleum Reserve Plan, Early Storage Reserve Plan, proposal or amendment;

(H) require any importer of petroleum products or any refiner to (A) acquire, and (B) store and maintain in readily available inventories, petroleum products in the Industrial Petroleum Reserve, pursuant to section 156;

(I) require the storage of petroleum products in the Industrial Petroleum Reserve, pursuant to section 156, on such reasonable terms as the Administrator may specify in storage facilities owned and controlled by the United States or in storage facilities other than those owned by the United States if such facilities are subject to audit by the United States;

(J) require the maintenance of the Industrial Petroleum Reserve;

(K) maintain the Reserve; and

(L) bring an action, whenever he deems it necessary to implement the Strategic Petroleum Reserve Plan, in any court having

jurisdiction of such proceedings, to acquire by condemnation any real or personal property, including facilities, temporary use of facilities, or other interests in land, together with any personal property located thereon or used therewith.

(g) Before any condemnation proceedings are instituted, an effort shall be made to acquire the property involved by negotiation, unless, the effort to acquire such property by negotiation would, in the judgment of the Administrator be futile or so time-consuming as to unreasonably delay the implementation of the Strategic Petroleum Reserve Plan, because of (1) reasonable doubt as to the identity of the owners, (2) the large number of persons with whom it would be necessary to negotiate, or (3) other reasons.

PETROLEUM PRODUCTS FOR STORAGE IN THE RESERVE

42 USC 6240.

SEC. 160. (a) The Administrator is authorized, for purposes of implementing the Strategic Petroleum Reserve Plan or the Early Storage Reserve Plan, to place in storage, transport, or exchange—

(1) crude oil produced from Federal lands, including crude oil produced from the Naval Petroleum Reserves to the extent that such production is authorized by law;

(2) crude oil which the United States is entitled to receive in kind as royalties from production on Federal lands; and

(3) petroleum products acquired by purchase, exchange, or otherwise.

(b) The Administrator shall, to the greatest extent practicable, acquire petroleum products for the Reserve, including the Early Storage Reserve and the Regional Petroleum Reserve in a manner consonant with the following objectives:

(1) minimization of the cost of the Reserve;

(2) orderly development of the Naval Petroleum Reserves to the extent authorized by law;

(3) minimization of the Nation's vulnerability to a severe energy supply interruption;

(4) minimization of the impact of such acquisition upon supply levels and market forces; and

(5) encouragement of competition in the petroleum industry.

DRAWDOWN AND DISTRIBUTION OF THE RESERVE

42 USC 6241.

SEC. 161. (a) The Administrator may drawdown and distribute the Reserve only in accordance with the provisions of this section.

(b) Except as provided in subsections (c) and (f), no drawdown and distribution of the Reserve may be made except in accordance with the provisions of the Distribution Plan contained in the Strategic Petroleum Reserve Plan which has taken effect pursuant to section 159(a).

(c) Drawdown and distribution of the Early Storage Reserve may be made in accordance with the provisions of the Distribution Plan contained in the Early Storage Reserve Plan until the Strategic Petroleum Reserve Plan has taken effect pursuant to section 159(a).

(d) Neither the Distribution Plan contained in the Strategic Petroleum Reserve Plan nor the Distribution Plan contained in the Early Storage Reserve Plan may be implemented, and no drawdown and distribution of the Reserve or the Early Storage Reserve may be made, unless the President has found that implementation of either such Distribution Plan is required by a severe energy supply interruption or by obligations of the United States under the international energy program.

(e) The Administrator may, by rule, provide for the allocation of any petroleum product withdrawn from the Strategic Petroleum Reserve in amounts specified in (or determined in a manner prescribed by) such rules. Such price levels and allocation procedures shall be consistent with the attainment, to the maximum extent practicable, of the objectives specified in section 4(b)(1) of the Emergency Petroleum Allocation Act of 1973.

(f) The Administrator may permit any importer or refiner who owns any petroleum products stored in the Industrial Petroleum Reserve pursuant to section 156 to remove or otherwise dispose of such products upon such terms and conditions as the Administrator may prescribe.

Rules.

15 USC 753.

COORDINATION WITH IMPORT QUOTA SYSTEM

SEC. 162. No quantitative restriction on the importation of any petroleum product into the United States imposed by law shall apply to volumes of any such petroleum product imported into the United States for storage in the Reserve.

42 USC 6242.

DISCLOSURE, INSPECTION, INVESTIGATION

SEC. 163. (a) The Administrator may require any person to prepare and maintain such records or accounts as the Administrator, by rule, determines necessary to carry out the purposes of this part.

(b) The Administrator may audit the operations of any storage facility in which any petroleum product is stored or required to be stored pursuant to the provisions of this part.

(c) The Administrator may require access to, and the right to inspect and examine, at reasonable times, (1) any records or accounts required to be prepared or maintained pursuant to subsection (a) and (2) any storage facilities subject to audit by the United States under the authority of this part.

Record-
keeping.
42 USC 6243.

NAVAL PETROLEUM RESERVES STUDY

SEC. 164. The Administrator shall, in cooperation and consultation with the Secretary of the Navy and the Secretary of the Interior, develop and submit to the Congress within 180 days after the date of enactment of this Act, a written report recommending procedures for the exploration, development, and production of Naval Petroleum Reserve Number 4. Such report shall include recommendations for protecting the economic, social, and environmental interests of Alaska Natives residing within the Naval Petroleum Reserve Number 4 and analyses of arrangements which provide for (1) participation by private industry and private capital, and (2) leasing to private industry. The Secretary of the Navy and the Secretary of the Interior shall cooperate fully with one another and with the Administrator; the Secretary of the Navy shall provide to the Administrator and Secretary of the Interior all relevant data on Naval Petroleum Reserve Number 4 in order to assist the Administrator in the preparation of such report.

Report to
Congress.
42 USC 6244.

ANNUAL REPORTS

SEC. 165. The Administrator shall report to the President and the Congress, not later than one year after the transmittal of the Strategic Petroleum Reserve Plan to the Congress and each year thereafter, on all actions taken to implement this part. Such report shall include—

Report to
Congress
and Presi-
dent.
42 USC 6245.

(1) a detailed statement of the status of the Strategic Petroleum Reserve;

(2) a summary of the actions taken to develop and implement the Strategic Petroleum Reserve Plan and the Early Storage Reserve Plan;

(3) an analysis of the impact and effectiveness of such actions on the vulnerability of the United States to interruption in supplies of petroleum products;

(4) a summary of existing problems with respect to further implementation of the Early Storage Reserve Plan and the Strategic Petroleum Reserve Plan; and

(5) any recommendations for supplemental legislation deemed necessary or appropriate by the Administrator to implement the provisions of this part.

AUTHORIZATION OF APPROPRIATIONS

42 USC 6246, SEC. 166. There are authorized to be appropriated—

(1) such funds as are necessary to develop and implement the Early Storage Reserve Plan (including planning, administration, acquisition, and construction of storage and related facilities) and as are necessary to permit the acquisition of petroleum products for storage in the Early Storage Reserve or, if the Strategic Petroleum Reserve Plan has become effective under section 159(a), for storage in the Strategic Petroleum Reserve in the minimum volume specified in section 154(a) or 155(a)(2), whichever is applicable; and

(2) \$1,100,000,000 to remain available until expended to carry out the provisions of this part to develop the Strategic Petroleum Reserve Plan and to implement such plan which has taken effect pursuant to section 159(a), including planning, administration, and acquisition and construction of storage and related facilities, but no funds are authorized to be appropriated under this paragraph for the purchase of petroleum products for storage in the Strategic Petroleum Reserve.

Mr. DINGELL. There is one question that we need to get to and that is the question of environmental impact statements and so forth. In connection with this matter I assume it is your purpose to see to it that those are submitted with regard to each of the specific sites which you will choose. Am I correct in that presumption?

Mr. NOEL. Yes, sir. They have been separately prepared, and we will provide to the committee copies, if they have not been so provided.

[The following environmental impact statements are on file with the subcommittee:]

"Draft Environmental Impact Statement for Weeks Island Mine;" FEA; September 1976; DES 76-8; FEA/S-76/349

"Draft Environmental Impact Statement for Central Rock Mine;" FEA; December 1976; DES 76-9; FEA/S-76/489

"Draft Environmental Impact Statement for Iron-ton Mine;" FEA; December 1976; DES 76-10; FEA/S-76/490

"Final Environmental Impact Statement for Bayou Choctaw Salt Dome;" FEA; December 1976; FES 76-5; FEA/S-76/501

"Final Environmental Impact Statement for Bryan Mound Salt Dome;" FEA; January 1977; FES 76/77-6; FEA/S-76/502

"Final Environmental Impact Statement for West Hackberry Salt Dome;" FEA; January 1977; FES 76/77-4; FEA/S-76/503

"Draft Environmental Impact Statement for Kleer Mine;" FEA; January 1977; DES 77-2; FEA/S-77/003

"Final Environmental Impact Statement for Cote Blanche Mine;" FEA; January 1977; FES 76/77-7; FEA/S-77/016

Mr. DINGELL. Very well.

The Chair recognizes now the gentleman from Virginia, Mr. Satterfield, who was the first to appear.

Mr. SATTERFIELD. I have no questions at this time, Mr. Chairman.

Mr. DINGELL. The Chair recognizes now the gentleman from Michigan, Mr. Stockman, who was the second to appear.

Mr. STOCKMAN. I would like to ask you, Mr. O'Leary, to elaborate on what you consider to be the impact on private stockholdings of implementing a strategic reserve plan of this sort. It seems to me there could be some pressure toward lower private stockholdings, which would be shifting the cost to general revenue. I do not see the value of that. I would like you to elaborate.

Mr. O'LEARY. Mr. Chairman, there has been a substantial body of experience with this matter particularly in the context of the administration of the strategic stockpile for strategic commodities that were entered into largely during the Korean war.

The chairman will recall that during the period of the Korean war we bid against market and built up very substantial stocks of copper, lead, zinc, and a number of other so-called strategic critical commodities. Then we began, in the early sixties and continuing up until about 1973 or 1974, a major destocking.

During that time it was quite evident if you were to take a look at industry inventories that the Government was acting as the inventory handler for industry. I think that that was largely a product of the way in which those programs were administered.

I want to make it clear that in my judgment what we are talking about here is the strategic reserve that will be drawn on in times of emergency.

Now, let us think about that sort of emergency. Clearly, if we had run into an oil emergency of the dimensions of the natural gas emer-

gency as a result of an interdiction, it seems to me we would have had to consider whether or not we would get into those stocks.

However, the primary reason for these stocks is for strategic interruption to supply. The whole industry has to know that the Government is not taking on the stocking, inventory responsibility for the industry.

That, Mr. Chairman, was the point of my digression in the prepared testimony with regard to stock levels. It seems to me that we must monitor industry stocks as we go along and, if need be, use the authority in the legislation in order to require the maintenance of stock levels in the event that we see any tendency on the part of industry to begin to say, "Oh, well, they will take care of us."

Mr. STOCKMAN. Would not requiring industry or the users of this contingency stock to absorb the carrying cost provide some incentive to do it themselves if they are paying for it anyway?

Mr. O'LEARY. I think that this philosophy was addressed in the formative stages of the legislation. There are clearly two ways to go. Europe by and large, particularly done in the NATO and OECD context, made a decision back in the fifties that industry should carry stocks. My recollection is that the stock levels that were required—this recollection is about 3 years old, Mr. Chairman—are conventionally 90-day stocks.

This meant that the costs, of course, were borne immediately in the first instance by industry but, of course, in the second instance by the people who bought the products. In our view, we can have a more efficient operation under the plan that is defended here and lower cost for the ultimate carriers of the cost, which is to say the consumers of petroleum products, which is to say the people of this country, by using this sort of mechanism we are working on here.

I believe that was the conclusion that was finally shared by the Congress when they enacted this particular piece of authorizing legislation that we are acting under, although clearly arguments can be made on the other side. In my own judgment that argument is now behind us and while keeping a very careful eye on industry stocks to see that there is no transference of responsibility to the Federal Government under the stocking program, I think, we should be content with that decision and go on with the stocking program.

Mr. STOCKMAN. I have not had a chance to read this because we just got it, but what do you envision as the sales price determination mechanism if a contingency arises and we have to go to the strategic reserve? How and in what way will we determine prices?

Mr. NOEL. The short answer to that, Mr. Stockman, is that we do not know at this moment. That is part of the allocation and pricing discussions that are ongoing and will be provided in a subsequent report to the Congress. We do not believe that that discussion should be conducted necessarily even in open session.

We do believe that depending on the situation as it occurs, there may be a variety of options available to the chief executive of the country as to what the price should be of that oil. Basically, as you can see, by having a stock of that sort we have a buffering mechanism that can be used to minimize the kind of traumatic effect, let us say, of a quadrupling of prices.

So, basically the short answer is we do not know at the moment. We probably won't know until we see the actual situation, but we are examining that question and continue to do so.

Mr. STOCKMAN. Thank you.

I have no further questions, Mr. Chairman.

Mr. DINGELL. The Chair thanks the gentleman.

The Chair recognizes now the gentleman from Indiana, Mr. Sharp.

Mr. SHARP. Thank you, Mr. Chairman.

I just want to get clear whether or not you think the timetable dates can still be met on the early storage by December 1977 and the 500 million barrels by 1982? Is it presumed we are on a schedule that we can do that?

Mr. O'LEARY. Mr. Chairman, the 150 million barrels is 1978. There is no question in my mind we can do that. Indeed we are considering now whether that is the appropriate number or a little bit too low.

Mr. SHARP. You can expand that?

Mr. O'LEARY. Yes.

Mr. SHARP. You briefly touched on the question of acquisition and how to go about doing that. I guess I am kind of curious for more information. Do you plan to set up schedules of purchase, or do you plan to be watching the market and trying to intervene at a certain point?

That obviously could have a major influence on the market. I think you indicated you hoped not to cause more than two-tenths of a cent increase in a barrel of crude.

Mr. O'LEARY. Actually, that was not more than a two-tenths of a cent increase per gallon of petroleum products. Essentially in terms of the world market, we will not be bidding away an enormous amount, given the period of time we are discussing here. So I do not think we will have severe impacts on the world market. Beyond that, we ought to manage the acquisition program in a way to do two things: First, to insure timely introduction of oil in the storage; second, to minimize our cost.

We intend to use all the flexibility available to us to achieve those two objectives.

Mr. NOEL. May I just add that we are presently working out an agreement with the Defense Fuel Supply Agency which is the only agency in Government I know of that is presently procuring major quantities of petroleum supplies. In fact, they are the procurement agency for the General Services Administration for that class of supply.

We are working an arrangement out with them so that we can use the experience they have already gained. It does appear at this point we will be conducting procurements in groups, if you will, based on our projected needs, fill needs, and that they will be able to issue procurements in either invitations to bid or requests for proposals, either method that seems most desirable at the time, depending on which of the two grades of oil we will be buying in that particular time interval.

Mr. SHARP. There is a lot of discussion, comment, rumor which has circulated on what is going to happen to the oil coming out of Alaska when it comes out of that pipeline. I wonder if there is so far any effort in discussions, planning, to try to coordinate Federal purchases with that.

Mr. O'LEARY. Gentlemen, that oil is not the appropriate mix for most of United States refiners. It is a relatively specialized crude. Although certainly that will play an important role in the U.S. supply and consequently reduce the requirement for storage, I do not think it is compatible with our storage requirements.

Mr. SHARP. Thank you very much, Mr. Chairman.

Mr. DINGELL. The Chair thanks the gentleman.

The Chair recognizes now the gentleman from Massachusetts, Mr. Markey.

Mr. MARKEY. Thank you, Mr. Chairman.

Have you made any special provisions for the New England area? What is the cost effectiveness for the peculiar problems that we have in that area?

Mr. O'LEARY. Gentlemen, at the moment the plan does not make special provisions for stocking in New England. We had a fairly long debate and discussion on this in the course of hearings last week before the Senate Interior Committee on this matter. At that point in the course of the discussion I pointed out we would examine that.

If we could find that there was, first of all, a need not being met by this in either New England or any other part of the country that required some regional treatment and, second, if we could find some cost effective technique for doing it, that we would then submit an appropriate revision to the plan.

Mr. MARKEY. Do you have any initial predetermination as to the cost effectiveness for the New England area? Do you think there ultimately will be something that will be considered to be a reasonable approach for our problems?

Mr. O'LEARY. I cannot prejudge that, but I can tell you that my conclusion will be reasonable. If we find a sensible way to meet the requirements of any particular region that makes more sense than the single regional storage feature used in the plan, then we will make an appropriate revision to the plan and adopt that change.

The point here, to note, Mr. Chairman, is that, as I said in the concluding statement, we are looking at this with new eyes and if there is any point that should be changed where rational analysis could convince us that the present program is inadequate and change is required, we will make that change.

Mr. MARKEY. Mr. Noel, you have studied this problem for a period of time. Do you have any judgments about the New England area? That is, its particular susceptibility to this type of program?

Mr. NOEL. Yes, I do, Mr. Markey. I think essentially we have given this extensive consideration. We have compared the cost, for example, or storage in New England by means available and, we think, technically feasible. Steel tanks obviously are a consideration.

Our calculations are that steel tanks are on the order of six times as expensive as would underground storage be in the gulf coast area.

Mr. DINGELL. Would the gentlemen yield? You have indicated in your statement that storage in salt domes would run around \$1.65 a barrel. Are you indicating that the costs in steel tanks would be approximately six times that level?

Mr. NOEL. Yes, Mr. Chairman. The figure we are using is the acquisition cost, and construction cost would be on the order of \$1.50, \$1.60 a barrel. There would probably be roughly 40 cents operating

cost for a 15-year cycle. We used the figure of \$2 as what it will cost to store a barrel of oil for 15 years in a salt dome.

It is our view based on industry estimates and our calculations that steel tanks under comparable conditions would be roughly \$12 a barrel for the same period to time. As you know, steel tanks have operating costs that you do not have with a natural cavern or a manmade cavern.

On the other hand, we have also looked at and we have considered extensively the possible use of rock caverns, on which, I suppose, the Swedes are the foremost experts, in this particular matter. We have dealt with at least one company that has dealt with the New England Regional Council and has talked to us extensively about the feasibility, and the engineering feasibility, of constructing rock caverns in New England for storage purposes.

I have two problems with that. Basically the rock caverns, our calculations at least, again assuming not only the construction cost and acquisition cost of the land but also the operating cost—

Mr. DINGELL. And disposal costs and environmental considerations?

Mr. NOEL. Yes, you have very serious environmental considerations, and those have to be mined with explosives. The costs of the rock caverns would be roughly three times what they are underground in the gulf coast areas, by our calculations.

The other factor is one of time. The estimates I have from my own engineers is that it would take 3 years at a minimum to construct suitable rock cavern storage in New England. We have examined six specific locations on the eastern seaboard, let me say north of Philadelphia, that conceivably could be used for that purpose, either for product storage or for crude storage.

We think if we construct such a facility it probably should be for product. There is not much point, of course, in establishing crude storage under those conditions.

We have also worked extensively with representatives, both public and private sector representatives from New England as to the substitutability of No. 4 for No. 6 oil, No. 6 being the product which is of most concern to people in New England, I believe.

Basically they are importing nearly 80 percent of their daily requirements. As a result of that they are very sensitive to the need to be sure that that supply is uninterrupted in an emergency. As Mr. O'Leary says, we are continuing to examine that question.

We think we will know more about that question as we get into more detail of the distribution, the existing distribution, the product pipelines that exist, what terminals might be available, what sites might be available near those terminals.

As Mr. O'LEARY has indicated both to the Senate Interior Committee and to you today, we will continue to examine that question and certainly will provide amended data if subsequent investigation indicates that is appropriate.

Mr. MARKEY. So you are talking for the New England area a cost escalation three to six times that of other parts of America?

Mr. O'LEARY. Perhaps. We have heard some indications there might be a cheaper storage location in New England.

Mr. MARKEY. Where would that be?

Mr. O'LEARY. I do not have the details on that.

Mr. NOEL. I might add one other point. There is one other consideration that has come to our attention over a period of time and that has to do with a facility, a mine which is available for lease in Canada. That site is attractive from the standpoint of engineering.

On the other hand, it is not available evidently for sale. Our initial economic analysis of that would be that the lease cost would make it not a particularly attractive proposition. It is attractive from an engineering point of view because it is existing capacity, it does have access to deep water, and it is some 600 nautical miles closer to the refinery complex in the Delaware/New Jersey area than the gulf coast storage.

On the other hand, there are other ways to solve that distribution of crude problem, but that would be an alternative as well to storage in New England. Now we have had, at a very preliminary level, discussions with the Canadian Government as to whether something like a treaty, not necessarily a treaty; would be possible to guarantee our access to that oil during an emergency. But that is also under consideration.

Mr. MARKEY. Thank you.

Thank you, Mr. Chairman.

Mr. DINGELL. The Chair thanks the gentleman from Massachusetts.

The Chair recognizes now the gentleman from Connecticut, Mr. Moffett.

Mr. MOFFETT. Thank you, Mr. Chairman.

Perhaps we can have some continuity in terms of regional interest. I would like to ask if you could provide us with information relating to the economics involved for the Newfoundland mine site and the economic analysis that you did on it—No. 1, a very simple question, you said it is not for sale, didn't you?

Mr. NOEL. My understanding is that it is not for sale. It is available for lease.

Mr. MOFFETT. Could you submit to the committee as soon as possible the information on that? Was there ever a determination made that the mine is environmentally unsound? Was that contention made in your report?

Mr. NOEL. I do not believe we have ever come to that conclusion. As a matter of fact, I think it is comparable in terms of its environmental impacts to underground storage in this country.

Mr. MOFFETT. I would like to know more about your consideration of that, though. I have had some contact with the people who are supporting the site. It seemed to merit at least serious consideration. I believe you and I discussed it at one time.

Mr. NOEL. Yes, sir.

Mr. MOFFETT. Mr. O'Leary, I will preface these questions by saying I have been very impressed with your efforts to date, particularly your candor and your emphasis on conservation and your healthy skepticism about contentions made by various people, industry people included.

I would like to say, however, that I am skeptical about data collection abilities. That skepticism has been heightened by my experience in trying to get information on the home heating oil situation. This hearing is not about that subject, and I will not take a great deal of time on that except to say to you that I have been unable to get information, satisfactory information, on the individual firms being

required to roll back, something you mentioned in testimony last week.

I have even had problems obtaining the list of firms being surveyed. I do not want to get into a discussion now except to say that we have been doing our own survey which indicates that the prices are higher than what we are being told by FEA. I know there may be no intent to deceive or withhold information, but I wanted to mention this because it bears on the question of data and what data is being supplied.

The first question I would raise with regard to this plan and our regional concerns is the adequacy of the transportation facilities and tanker capability. I would like to be assured that we have a good grasp on what kinds and numbers of tankers are going to be available.

What is to prevent tankers from circulating offshore waiting for prices to rise, for example? Is the present supply of tankers adequate? Will the refineries be adequate? We are dealing with refiners here who are not under control of the U.S. Government and transportation facilities which are not under the control of the U.S. Government.

I would like to know what kind of research has been done so that you can give those of us in New England some solid assurances that we are not going to be sitting there out of fuel during an embargo dependent on transportation facilities or refineries that really do not deliver.

Mr. O'LEARY. I would like to give you two answers to that, Mr. Moffett.

The first has to do with the general basic data question. I agree with you, one of the real poisoners of the entire energy problem that we are facing here is the inability of people to find data that they can trust. I have addressed this in testimony over the years before various committees of the Congress and suggested various resolutions to that.

I think we will have an opportunity to do something quite useful in terms of the coming reorganization of the energy agencies of the Government so that we can have some insulation and build some, to use an over-used word, credibility back into those numbers.

The second point has to do with the specifics of this regional stocking question. I have indicated in the earlier testimony that I alluded to that we are prepared to examine this de novo and we are prepared to examine it further with, in addition, the Department of Defense and the staffs of the committees concerned.

I would like to make them a party to that examination. So that as these questions arise, not simply in a very short period of time over the witness table, we can have the staffs at it and get all these questions out in the open. I think they are legitimate, they should be addressed and we should understand thoroughly before we commit ourselves to a course of action that it is the appropriate one.

Mr. MOFFETT. That is the assurance you are giving me about future action. But we are being asked to buy a plan now, while contradictory information exists. For example, the New England electric systems strongly oppose this plan, and dispute the FEA's figures on the amount of local stocks and crude en route available to meet needs during an embargo.

They cite the transportation problems during the 1973 embargo. They say the New England electric systems sometimes have 3 to 5 days of stocks on hand instead of the 7 days cited by the agency.

These are the kinds of conflicts that trouble me and trouble the electric systems people, and trouble the Governor of my State, and some witnesses that we will be hearing from later on.

Mr. O'LEARY. Mr. Moffett, I think that the strategic imperative in connection with this plan is that we move forward, that we go to the 45-day period and move forward with it. I promise you and I promise the chairman of this committee that we will look at these questions.

They are really part of the whole series of questions that we addressed in that previous testimony. We will look at them objectively with the new eyes of a new administration that has demonstrated a sympathy for the problems that are being confronted nationally and in your part of the country in the oil business.

If we find in the course of that that the premise leading to our present conclusion with regard to where those stocks should be is incorrect, we will correct that with an amendment to this plan. I think it is essential that we move forward through the time phasing and not stop this plan because we ought to begin to stock now. We know we are not throwing any bridges by doing so.

Mr. MOFFETT. Let me say to you that I intend to support the plan. I like the basic thrust of it. I do not want to be parochial about the New England concerns and say that I am not going to support this because you do not have a regional storage system.

I very much want to support this plan whether other people in New England do or not, because it is in the national interest. I think Mr. Noel has done a fine job in preparation. I may have certain questions and criticisms, but do not take my questions to indicate that I am going to take part in any type of New England roadblock.

What I am saying is that I would like to see those figures that you are using justified and the alternatives that you have rejected for the early plan studied quite thoroughly, including the mine in Newfoundland. If you come to us and say industry is not storing what it should be, I think that should be said. I think our industry ought to be told and our region ought to be told we should do our share.

Thank you.

Mr. DINGELL. The Chair thanks the gentleman.

The Chair recognizes the gentleman from Texas, Mr. Gammage.

Mr. GAMMAGE. No questions, Mr. Chairman.

Mr. DINGELL. The gentleman from New York, Mr. Murphy.

Mr. MURPHY. Mr. Noel, what effect would the passage of legislation that would require a fixed percentage of 30 percent of oil imports to be carried in American-flag ships, what effect would that legislation have on this program?

Mr. NOEL. I think, Mr. Murphy, that presently we are subject to the provisions of the Cargo Preference Act which is that 50 percent of all government-owned cargo has to be transported that way. One of the questions that we have to examine is whether it is U.S. cargo or where does it become U.S. cargo?

I think it is fair to say that whatever the provisions are of any type of legislation of that sort requiring us to ship in U.S. bottoms, additional cost or any cost which is greater than that, let us say, available from other ships, as additive to the total cost of the program.

Mr. MURPHY. On the cost of the program, 500 million barrels and at a total cost of between \$7.5 and \$8 billion, is this the range of

various types of crudes that you are going to store or is this the present OPEC price that you have calculated?

How did you arrive at \$7.5 to \$8 billion figure, based on the 500 million barrels?

Mr. NOEL. That figure does not presume any future OPEC price increases. It does not really presume any inflationary increases that are unknown to us at this point. Given the instability in the pricing of oil, we simply do not know what 5 years from now we will be paying for a barrel of oil.

We also are not sure what the full impact of the shipping provisions of the cargo preference or subsequent legislation such as that you described will be on the program. That has not been included.

Mr. MURPHY. On payment for this program, Mr. O'Leary, I noted you had a section set aside. Would you describe to me how you envision the payment provision for this oil will take place?

Mr. O'LEARY. May Mr. Noel answer?

Mr. NOEL. If I might touch on that, basically it is our belief that the oil for this program should be acquired at roughly the same cost of a barrel of oil which is run through a refinery. In other words, we would take advantage of the existing cost equalization program for crude run through a refinery in this country.

We are assuming we will acquire the oil which goes into the program at roughly the same cost as a barrel of oil run through a refinery. That is the national composite average. In other words, the average of both tiers of domestic as well as the imported price.

That is our presumption. We have announced hearings for the 23d of this month to receive public comment with respect to that proposal.

Mr. MURPHY. That is the cost. Who is going to pay for it? Will the Treasury write out a check for it?

Mr. NOEL. The difference between the world market price and national composite average will be passed through on all the barrels of oil that are run through, in other words, using the entitlements system for that purpose. The national composite average price will come out of Federal revenues, in other words, out of the Federal budget.

Mr. MURPHY. You won't have a user charge, then? Those refineries that would be the users of that crude then would not participate directly in the payment for that storage program?

Mr. NOEL. He is participating to the extent that his prices will go up slightly, something on the order of two-tenths of a cent per gallon of product as a result of the entitlements program I have described. Otherwise the cost of program will be borne entirely out of general revenues.

Mr. MURPHY. I am not sure that I see the rationale of taking a price-controlled product in the United States and in effect taking what we already have physically located in the United States and theoretically moving it into a reserve position.

I would think it would be more appropriate to take the foreign product and use that as your total reserve and not average it out with an American price. I think we get into a false dollar figure.

Mr. NOEL. I should say one thing. First of all, the new administration has required my office to reexamine alternative pricing provisions for the program. We are presently conducting those studies. Funda-

mentally I know you understand, Mr. Murphy, that we are presently using more each day than we can produce.

Obviously any additional requirement means an incremental barrel of imports. So, essentially what we are saying is that the cost of that incremental barrel will be treated as any other imported barrel and its price will be apparently reduced by combining it with the domestic production.

Mr. MURPHY. Thank you, Mr. Chairman.

Mr. DINGELL. The Chair thanks the gentleman.

I would like to direct your attention, if you please, to section 546 of EPCA. That is the technical purchase authority. Under that, as I understand it, you are able, by the power conferred upon the President, to implement a procedure whereby the United States may directly purchase and may exercise the exclusive right to purchase and import all or any part of the crude oil, residual fuel oil, and petroleum products from foreign owners for resale in the United States.

Have you explored the utilization of that particular provision with regard to the filling of the petroleum reserves?

Mr. O'LEARY. Mr. Chairman, we are examining all of the technical authorities, all of the authorities available to us, that will permit us to most efficiently accomplish the fill job, including this one.

Mr. DINGELL. That confers on the President enormously broad powers for the purpose of purchasing petroleum and petroleum products abroad, does it not?

Mr. O'LEARY. Yes, it does.

Mr. DINGELL. It enables the President, for example, to negotiate directly with foreign governments in foreign countries?

Mr. O'LEARY. It does, Mr. Chairman.

Mr. DINGELL. It also authorizes the President, I would suspect, to utilize other authorities such as authorities for the sale of surplus commodities and so forth. Has this been explored?

Mr. O'LEARY. Mr. Chairman, we are in the process of an exploration of this point, as I indicated earlier.

Mr. DINGELL. I am getting to a very specific point, and I wish to receive very specific answers. Has it been explored up to this time?

Mr. O'LEARY. Mr. Chairman, I have discussed this with members of the administration in the sense of preliminary explorations. We have not explored it in detail. We are in that process, now.

Mr. DINGELL. Was this explored by the previous administration in connection with their submissions to the Congress?

Mr. O'LEARY. Perhaps Mr. Noel can address that.

Mr. NOEL. Yes, sir, there were some very preliminary and tentative contacts between Frank Zarb, the former Administrator of FEA, and certain producing countries. Those contacts did not materialize. The types of crude that were available under those tentative contacts were not suitable for the program.

There have been some other very tentative contacts which I have reason to believe were essentially suspended sometime after early November and are expected to commence shortly.

Mr. DINGELL. I will not ask you why because I suspect that is not something I really want to inquire about in a public meeting, but I will be asking the staff to explore the process and the progress which you have made in connection with these matters in order to be assured that this authority is being fully used.

So that we can put this matter in perspective, we are talking about 90 days of imports. We are talking about \$7 or \$8 billion and we are talking about the equivalent of, as I see it, something like 50 or 60 days' petroleum use inside the United States, even under the heavy use conditions that occurred during the worst part of January and February in the cold weather we were experiencing at that time.

Have any estimates been made in terms of the savings to the consumers under this particular approach?

Mr. O'LEARY. Not by this administration. It may have been made by the previous administration. We have not moved to that level of analysis on this particular authority.

Mr. DINGELL. Am I unfair in feeling that that is an essential part of this plan?

Mr. O'LEARY. Mr. Chairman, clearly the discussions that I alluded to earlier reflect your view that this is one thing that should be examined very carefully in the context of this plan.

Mr. DINGELL. I will say that Mr. Zarb did discuss his activity in this matter with me and they had my full approbation. I am aware of the fact that with the change in administrations and Mr. Zarb's departure it may have somewhat caused problems in connection with this particular matter.

I feel very strongly that this should be done as an alternative. As I see it, this kind of action could not inconceivably result in substantial savings to the taxpayers on this matter; am I correct?

Mr. O'LEARY. I think that very, very carefully handled, Mr. Chairman, that is a possibility.

Mr. DINGELL. I would like to turn now to the question of transportation of oil and products to different parts of the country. Can you tell us whether or not you have adequate transportation available to assure that if this petroleum is stored as you have outlined to us, that it can be moved to refineries in other parts of the country such as New England and the Middle West and that product can be made available to places like New England and the Middle West so that there will not be economic and other difficulties, locations in those areas because of an inadequate supply of either product to the marketplace or crude to the refineries?

Mr. O'LEARY. Mr. Chairman, the entire predicate of the analysis that led to the development of the plan was, of course, to accomplish precisely that, put the stocks where you are close to a transportation link that will take it to the refiners.

That will be accomplished by three or four techniques. There will be movement into these refineries by displacement. In those instances you won't really have to make the connection. If you can bring, for example, oil from the reserves in the gulf into the coastal refineries, you can reduce the amount of drain that they have on the Midwest, if that should become desirable, and move crude into those refineries and keep them well.

There is the general proposition that during an embargo, during any interdiction of supply, tankers will be more available than is normally the case. So you ought to have good ocean transportation for moving both crude and a wide variety of products available to you.

Of course, we have good on-loading and off-loading facilities in the gulf to take care of that sort of thing. There will be a substantial

volume of oil on the high seas in the event of any interruption and that has to play into it.

There will be a substantial volume of product, particularly for New England, on the high seas, resid will be coming in in a pipeline that is several days longer, 10 days longer thereabouts. However, Mr. Chairman, in line with the earlier discussions I cannot assure you from my own knowledge at this particular point in time that all of the regional requirements of this country will be met by the plan before you.

I can tell you that we will look at it. As a matter of fact, you may wish for the record the letter that I sent to, among others, Senator McIntyre this morning dealing with the regional problem, in this case specifically New England. I think a reading of that letter, Mr. Chairman, will indicate our concern for precisely the question that you have asked.

[The following correspondence was received for the record:]

FEDERAL ENERGY ADMINISTRATION,
OFFICE OF THE ADMINISTRATOR,
Washington, D.C., February 16, 1977.

Hon. THOMAS J. MCINTYRE,
*U.S. Senate,
Washington, D.C.*

Dear Senator McIntyre: This is in response to the letter of February 3, 1977, from you and other Senators from New England, regarding the Strategic Petroleum Reserve (SPR) Plan.

I agree entirely with the recommended steps set forth in your letter. As I stated during hearings before the Senate Interior Committee on February 4, I want to reexamine this issue personally in view of the concerns raised by you and other New England representatives.

As a minimum, I intend to comply with your recommendations that we:

Request the Department of Defense or other outside organizations to make an independent strategic analysis of the Strategic Petroleum Reserve Plan, with a particular focus on the reliability of Caribbean refineries and foreign flag tankers during a variety of possible interruptions;

Develop a complete Distribution Plan, and standby allocation and pricing regulations; and

After completion of the above efforts, re-analyze the question of whether product storage in New England or other areas is necessary.

I can assure you that I will not hesitate to recommend that the Plan be amended to provide product storage in New England or other regions if this careful re-examination does not satisfy me that regional needs, and especially those for imported products, can adequately be met by an SPR consisting of crude oil stored in the Gulf Coast area and a distribution plan for using that crude oil to satisfy regional requirements.

I am sure you realize that this commitment to perform the strategic analysis, the development of complete distribution, allocation and transportation plans, and a reexamination of the regional product storage issue is a major additional undertaking. You may be sure that this will be a high priority effort in this agency, however, and I fully expect that we will complete it in time to submit our findings, conclusions and any appropriate Plan Amendments to Congress no later than next December 15, along with our first annual report on the progress of the SPR Program. As stated in the SPR Plan, our analysis will examine a number of factors of particular importance to New England and other regions. These will include:

The availability and potential utilization of industry inventories;

The ability of the Government to control the movement of U.S. and foreign tankers;

The ability to manage refinery yield during an emergency;

The mechanisms for assuring that importers of refined products will have alternative sources of supply if needed;

Procedures for controlling or equalizing the prices of products; and

The need to provide for equitable treatment of all areas of the country with the objective of minimizing the economic impact of an interruption.

I intend to ask representatives of New England and other regions to participate with the Federal Energy Administration in developing these distribution, allocation, pricing and transportation plans.

I want to emphasize that I do not view the SPR Plan, which the Congress is examining, as the "final" plan for this Program. I view it as a dynamic Plan which can be changed as necessary to reflect changing circumstances regarding our vulnerability to severe interruptions and as we identify more effective or efficient means of responding to those emergencies. The Energy Policy and Conservation Act provides a mechanism for amending the SPR Plan, and I will not hesitate to recommend such amendments whenever I believe they are desirable.

Although we may conclude that some modifications in the Plan which the Congress is now examining will be required, I regard it to be essential that we proceed as quickly as we can with the development of the crude oil storage proposed in the Plan. I would hope, therefore, that you will support the Plan as it is now formulated pending subsequent reexamination of the regional product storage issue.

I fully understand your concerns about the Reserve Program, and I will be happy to continue to discuss these with you personally as you desire.

Sincerely,

JOHN F. O'LEARY,
Administrator.

U.S. SENATE,
COMMITTEE ON ARMED SERVICES,
Washington, D.C., February 3, 1977.

Hon. JOHN O'LEARY,
*Administrator, Federal Energy Administration,
Washington, D.C.*

Dear Mr. O'Leary: As you know, the Energy Policy and Conservation Act requires the Federal Energy Administration to develop a plan that will reduce the impact of any future disruption of petroleum imports into the United States. A proposed plan has been submitted to Congress, and will take effect unless withdrawn by the FEA or disapproved by Congress before February 18.

After reviewing the strategic petroleum storage plan, we have concluded that it probably will not protect the New England states from potential supply disruptions. Also, the plan may not fully meet the requirements of Section 157 and 161 of the EPCA.

We believe the Strategic Petroleum Reserve (SPR) proposal may be incomplete or deficient in the following respects:

(1) The crude oil Distribution Plan described in Sec. 161 has been omitted from the SPR Plan. The plan submitted to Congress states, "A detailed Distribution Plan has not yet been developed" (SPR Plan, Dec. 15, 1976, p. 149). Without such a Distribution Plan, New England and the rest of the nation have no assurance that crude oil and oil products will be made available where needed if a disruption occurs.

(2) The SPR Plan does not provide for regional storage in New England or readily accessible to New England as required by Sec. 157.

The omission of regional storage is contrary to the recommendation of the New England Federal Regional Council, in which the FEA took part. The Council recommends that No. 4 oil be stored in rock caverns close to major port terminals in New England (See "A Report on Emergency Petroleum Storage in New England," N.E.F.R.C. Energy Resources Task Force, October, 1976, p. 49).

In addition, the SPR apparently does not insure that petroleum supplies be "readily accessible to" New England, as required by the EPCA. The SPR Plan submitted to Congress states on page 151, "Actual transportation arrangements for movement of SPR oil will be the responsibility of the private sector." Further, the SPR Plan states on page 150 that "... allocation and other necessary regulatory procedures will be developed ..."

In short, no mechanism has been created by FEA to insure that oil will be distributed. FEA concluded that sufficient tanker capacity exists but is relying completely upon the oil industry to provide tankers of the right sizes and types, and in the right numbers to be where they are needed at the moment a petroleum disruption may occur.

(3) Even the conclusion that sufficient tanker capacity exists may soon be invalid. In a report prepared for the Department of Defense former FEA Assistant Administrator Melvin Conant recommends that the U.S.—"Establish a watch over tankers, including particularly the future availability of the smaller tankers

which continue to play the major role in transporting U.S. supplies and product tankers, which may be in short supply or under producing state control as increasing quantities of oil flowing in world trade will take the form of products rather than crude."

(4) Petroleum product supplies in New England may be more dependent today on Arab crude oil than contemplated by the SPR Plan.

Recent trade press reports indicate that Caribbean refineries may be increasing their use of Saudi Arabian crude oil due to the lower Saudi price in OPEC's two-tier pricing system.

This shift of supply source could not have been anticipated by the SPR Plan which was drawn up before the OPEC two-tier pricing situation came into being.

As a result of the new pricing structure, an Arab oil embargo might create larger demand from the East Coast than anticipated in the SPR Plan.

With these potential problems in mind, we request that the FEA revise the SPR Plan. We recommend the following steps to insure that the plan protects New England consumers and meets its statutory objectives:

Subject the plan to rigorous strategic analysis by the Department of Defense or other outside agency;

Develop a Distribution Plan, standby allocation and pricing regulations and "tanker watch" or transportation plan as integral parts of the SPR; and

After rigorous analysis, consider once again whether product storage in New England is necessary as part of the SPR.

Thank you.

Sincerely,

Thomas J. McIntyre.
Edward M. Kennedy.
Patrick J. Leahy.
John H. Chafee.
William D. Hathaway.
Edmund S. Muskie.
Edward W. Brooke.
Claiborne Pell.
Robert T. Stafford.
John A. Durkin.
Abraham Ribicoff.

Mr. MOFFETT. Mr. Chairman, would you yield briefly on that point?

Mr. DINGELL. Certainly.

Mr. MOFFETT. On the question that I raised earlier about what is to prevent tankers from waiting for the price to go up, could you make certain that you try to respond to that?

Mr. O'LEARY. Yes.

Mr. MOFFETT. You mentioned several times reliance on conservation measures.

Mr. O'LEARY. Yes, sir.

Mr. MOFFETT. Now, we have one effect, obviously, if you are relying on mandatory measures. We have another impact if they are voluntary. One could make the case that voluntary measures might be discouraged in a sense by the presence of a strategic petroleum reserve in that people would say that there is a reserve there and why should we conserve, in fact, why should we store? I know you have some authority to require industrial storage.

Mr. O'LEARY. We do.

Mr. MOFFETT. Second, with regard to conservation, and I am sure we will be having more hearings on this, isn't it true that this would appear to require some mandatory measures as well?

Mr. O'LEARY. I think that careful consideration has to be given to all of the weapons in the arsenal of getting the job done, including mandating.

Mr. MOFFETT. Thank you, Mr. Chairman.

Mr. DINGELL. The gentleman from Massachusetts.

Mr. MARKEY. Not to reflect an overly parochial point of view, but could I ask the Administrator for a second to turn to page 99 of the report? That is, to compare his verbal statements with an analysis which was apparently done and relied upon in his projections for the need in the New England area?

That is on table V-I, on page 99. It says in the period 1973-74 that the New England area was relying 58 percent upon imported residual fuel oil. Our own Federal New England Regional Council has it at 77 percent.

Your earlier statement today is 80 percent. Yet your projection for the New England area also in table V-I, foresees a decline in a 3-year period to only 31-percent reliance on imports. It seems to me that these figures are critical to your analysis of the needs of the New England area in the near future and seem to run in total contradiction with your own verbal statement and analysis.

Mr. O'LEARY. I think we are running now 80 percent. The underlying point that I am making here, Mr. Chairman, is that I have committed to review the predicate, the analytical base, for the conclusion that we did not need regional stock.

I have committed to do that not simply in a private room contemplating my own numbers, but to do that in conjunction with the Department of Defense and to get their inputs and the other security agencies' and in conjunction with the appropriate staffs of the committees.

So, I really think I have to agree with you that there is a question in my own mind in regard to the predicate, and we are going to take a look at that jointly and, I think, that we will come up with an answer that, while not perhaps satisfactory to everyone, at least we can all agree is based upon the right set of numbers.

Mr. MARKEY. You do not accept the numbers in the report?

Mr. O'LEARY. I think things are changing very rapidly now. It depends on where that goal is. We have a regional spread there on that particular number. This is a fairly complicated business to break out just exactly the region—

Mr. MARKEY. Fifty-eight percent on its face seems fairly inaccurate, though.

Mr. O'LEARY. Yes. Mr. Noel has a point to be made in that context.

Mr. NOEL. I believe one of the problems we have had, Mr. Markey, is that one of the questions with respect to numbers is how are the Virgin Islands and Puerto Rico considered? The difference between the 58 and the 80 percent you are talking about here, is that 58 percent is roughly what is coming in from foreign countries, if we treat Puerto Rico and the Virgin Islands as domestic sources.

The total to New England is about 80 percent, if Puerto Rico and Virgin Islands shipments are considered to be imports. There have been many discussions, and shall I call them creative discussions, with Mr. Alford of New England Electric & Utilities. I think we agree on what we disagree on and, I think, that is very healthy.

We are homing in on those questions. May I say Mr. O'Leary has put plenty of pressure on us to resolve those. I assure you they will not remain unresolved.

Mr. MOFFETT. Related to this, I mentioned some figures earlier that do not seem to be in agreement and are related to the question by the gentleman from Massachusetts. The SPR plan—I think this is a proper quote—says only a small amount of imported refined product is expected to be lost on even large embargo interruptions?

That is not necessarily true, is it, for the Northeast?

A supply interruption of 50 percent with 70 percent if New England's residual supplies being imported would be devastating, would it not, unless you have some plans for increasing demand that we do not know?

Mr. O'LEARY. No. You cannot operate on the demand side in that type of crunch. The supplies come from Venezuela and from other points in the Caribbean. We have a long, historic relationship with Venezuela on this trade. In the fifties they began to build topping plants and in the early sixties that resid began coming into the United States and displaced the coal that was burned all up and down the Eastern seaboard, including Connecticut.

Mr. MOFFETT. I can understand that. Speaking of splits in OPEC and the producers, what about the option of direct negotiations with foreign producers during the time of embargo? Was that option rejected? For example, dealing with Saudi Arabia, which is clearly a moderating influence in this whole game, and the possibility that they might sell at lower prices if the oil is not destined for the world market, is that an option that was rejected?

Mr. O'LEARY. The chairman rejected this in the series of questions we had a few minutes ago. My answer was that, yes, we are addressing it.

Mr. MOFFETT. Thank you.

Thank you, Mr. Chairman.

Mr. DINGELL. If you will return, Mr. O'Leary, to the technical purchase authority, have any cost studies been made as to which is the most advantageous method utilizing the route outlined in your statement or utilizing the technical purchase authority with regard to the acquisition of the oil?

Mr. O'LEARY. Mr. Noel can probably handle that historical question.

Mr. NOEL. Essentially, we have tried to evaluate it, one from the standpoint of the net cost to the economy. If it were possible to procure oil directly on a government-to-government basis, let us say at a discount below the world price, obviously the net cost to the U.S. economy would be reduced and that would be a very desirable goal.

We have no indication to date that such discounts for the types of oil we need are available. However, as you have suggested, Mr. Chairman, we need to continue to examine that question. On the other hand, if you are talking about budget outlays, and that is a source of concern to both the old and the new administration, the entitlement scheme that we have described here we will be holding hearings on on the 23d of February, has the effect of passing directly through to consumers something on the order of \$500 million of the expense directly to the fellow who uses the product, the end user.

That has two positive benefits. One, it reduces the budget outlays and, two, it does pass through a proportionate increase to the fellow who is using it.

Mr. DINGELL. To deal with this question though, there are two problems that I see. Isn't it a fact that, first, this constitutes a new use of the entitlement pool?

Mr. O'LEARY. It does, Mr. Chairman.

Mr. DINGELL. And this was never previously contemplated either by FEA or OMB or by the Congress in connection with their respective considerations of this matter?

Mr. O'LEARY. Yes. Of course, this will be addressed by the Congress in the budgetary context.

Mr. DINGELL. I would be loath to see the Appropriations Committee tell you how to use the entitlement pool. That would cause us great distress when we consider the matter related to your affairs and—

Mr. O'LEARY. And I am sure that will be discussed by your committee.

Mr. DINGELL. Doesn't this also reduce the effectiveness of the entitlements program's primary objective of equalizing petroleum costs around the country?

Mr. O'LEARY. I do not think it does, Mr. Chairman. I think that we can devise ways in which the burden is shared equally around the country. It does have the effect of putting additional costs on products. I think we can do that in a way that is relatively uniform.

Mr. DINGELL. If we procure this petroleum for the reserve by utilizing the tax mechanism, we get one set of impacts on the economy and on the people of the United States. Is that correct?

Mr. O'LEARY. We do, Mr. Chairman. I think at bottom we have to pretty strongly equate the taxpayer with the oil consumer.

Mr. DINGELL. That is the next question.

I do not want to challenge you on that. I think you are getting little ahead of me. Can I not infer that the impact when you impose it through the entitlements mechanism and through the direct purchase mechanism is going to be a rather difficult impact in terms of hitting different folks differently?

Mr. O'LEARY. Mr. Chairman, we have, as you know, the question of where does the next billion dollars of tax revenues come from? We have, as you know, a very complicated tax system that partakes of individual income, corporate income, excises, import taxes, a whole range of things that you are much more familiar with than I am.

Similarly we have a bunch of people out there using oil. This is addressed at the users of oil. Probably in a perfect world consistent with the idea of internalizing these sorts of cost what you would do is use some mechanism that precisely equated beneficiaries of the program with the cost.

I really think that it is virtually impossible to track with precision—you can with classes—but with precision the impact on any region or any group, of taking the first 100 percent tax approach and, of course, Mr. Chairman, talking about the margin in the total program of \$7.5 to \$8 billion we are talking about the entitlements accounting for about half of a billion dollars total. So, the bulk of the program is going to be borne by taxpayers and we are really talking about whether or not this marginal volume should be borne by the taxpayer or by the oil consumer.

Mr. DINGELL. That is precisely the point. I am not sure if we have hard facts or any hard judgment as to how the impact of proposals necessarily fall. Am I correct in that presumption?

Mr. O'LEARY. Yes, I think you are.

We are, as you know, a little later this month, the 23d of this month, holding a hearing on the notice of proposed rulemaking that addresses this question. We expect to have inputs from the public and from interested industry and probably from consumer groups on this point.

I think that will give at least me a more comfortable stance with regard to the position we ultimately take.

Mr. DINGELL. You indicated in your statement, and, I believe, the statute so requires that we have essentially two or three reserve actions. One is the early reserve program which is 150 million barrels. The second is the 500 million barrel reserve, which you have discussed at page 2 of your statement, which does not necessarily equate to any statutory requirement but which is an internal FEA goal, I assume.

The last is the 1-million barrel reserve. Can you give us your approximate deadlines on achieving these three storage levels?

Mr. O'LEARY. Mr. Chairman, the critical question for today, for the next week or two, and this is a budgetary question, so you will appreciate that I cannot go very far with it, Mr. Chairman—has to do with the immediate end of 1978 number.

My own feeling is that there is a substantial argument for increasing that number and that is being reviewed now both from the standpoint of the good things that would flow from such an increase and the negative that would flow from such an increase, and that will be concluded in time for submission within, I suspect, the next 10 days of the President's revisions to the Ford budget.

Mr. DINGELL. Now, you have indicated that you are considering salt dome storage. At page 6, in the last four lines of your second paragraph of your statement you say, "Central Rock and Ironton mines would serve the Ashland or Mid-Valley pipelines."

Does that indicate storage mines, or are those salt domes?

Mr. O'LEARY. Those are mines, Mr. Chairman. As we move up the scale of fill, we will probably move into those sorts of locations.

Mr. NOEL. There were five mines and three salt domes under consideration among the eight early candidate sites. You mentioned the two limestone mines the Ironton and Central Rock limestone mines.

There are also three salt mines under consideration, one in Texas and two in Louisiana. There are then three salt domes under consideration.

Mr. DINGELL. You have indicated at page 7 the FEA has decided not to exercise its discretionary authority at this time, in reference to the industrial petroleum reserve. Would you want to extend that, that you should contemplate some sanction of that sort?

If you propose to bottom the cost of this largely on the user as opposed to the taxpayer through utilizing the entitlement mechanism, I am not sure why you would make the distinction here.

Mr. O'LEARY. Mr. Chairman, I did note in the testimony at that point the fact that we were now, as a result of the regional discrepancies that I noted in the examination of the numbers last week, beginning to think a little bit about this, and it is not clear that this position will stand.

Also, we have to take into account the points Mr. Stockman raised earlier with regard to the impact of a Federal stocking program on industry inventories. I think that that means that we cannot simply say that they are unconnected as has apparently been maintained up to now.

I think they are really tied and we ought to address this. It may be that the earlier conclusion is correct, but it will be addressed *de novo*.

Mr. DINGELL. It occurs to me that the petroleum reserve matter is essentially an emergency matter. Consistent with that are two other emergency powers which have been conferred upon the President under EPCA. The first being the rationing planning, the second being the energy conservation and contingency plans which are affording many as powers under that statute.

Can you tell us whether these three powers and these three plans or groups of plans are being considered together or whether they are being considered apart and, if so, how are they being interrelated?

Mr. O'LEARY. Mr. Chairman, they are all really part of a solution to an interdiction. If you could have sufficiently severe curtailment by the conventional means of arm-waiving that has been really quite effective over the last month in the natural gas problem, then, of course, you do not have to go to stocks.

Now, the assumption in the strategic petroleum reserve plan is a 3-percent saving through conservation measures. We must look at this in conjunction with the overall conservation plan that is being re-examined now by the administration, by FEA, in conjunction with the overall objectives that we have in here.

So, really the whole thing plays together. It has to be looked upon, each of these elements has to be looked upon as part of a single policy of how you handle an emergency and we intend to address it in just those terms.

Mr. DINGELL. Now, in response to questions from Mr. Markey and Mr. Moffett, you indicated that you would be monitoring the way these matters are conducted in connection with the emergency petroleum reserve.

I understand EPCA to impose upon you the duty to reporting to the Congress, on an annual basis. I would assume that you would conduct your monitoring program and your report to the Congress as a part of an integrated, carefully run operation, am I correct?

Mr. O'LEARY. Mr. Chairman, would that it were so that we were required to report to you on an annual basis. It seems to me on looking at the deadlines that we report to you more on a weekly basis. We should run the agency and indeed the reorganization that will be before this body before long, will permit us, I think, to run the several agencies involved in this as a system designed to achieve the national interest in the energy business.

Mr. DINGELL. I have no objections to that, I hope you understand.

Mr. O'LEARY. Of course, as we pull through this, I think at first, let me tell you, Mr. Chairman, that my own feeling and that of Dr. Schlesinger—and both of us are systems-oriented—is that we do bring together these authorities and the agencies that administer them into some sort of comprehensive whole that gives the country a shooting chance to get out of this hole.

Mr. DINGELL. We are in full accord on that. I would assume then that you will monitor these matters with some care.

Mr. O'LEARY. We sure will.

Mr. DINGELL. And your reports will reflect that careful monitoring?

Mr. O'LEARY. I suspect, Mr. Chairman, you will be disappointed at first. Many of the reporting requirements are already in the mill. They are far advanced. There are statutory deadlines that have either been observed or been breached, but we will attempt to move them forward.

Mr. DINGELL. Most of them have been breached. I do not want you to consider that comment to be critical.

Mr. O'LEARY. As rapidly as we can in light of the other priorities that are forced upon us, we will try to go forward. You know that an enormous amount of the senior staff time, including my own, of the last month has been aimed purely and solely at dealing with the natural gas matter.

Mr. DINGELL. I am well aware of that. I would point out to you that it would be my wish that statutory authority be brought to the attention of the appropriate committees for the purpose of making the necessary amendments required to utilizing the reorganization statute on that particular point.

I think you will find broad agreement on this committee and, I suspect, the same holds true throughout the Congress on that particular point. While we are anxious to see that you have the tools at hand, we are very troubled at the methodology of arriving at that highly desirable goal.

The Chair recognizes Mr. Demarest for questions.

Mr. DEMAREST. Thank you, Mr. Chairman.

Mr. O'Leary, the General Accounting Office has prepared a report after a review of this program. That report will be discussed later today. If I might, I would like to ask you one question that is directed at a particular problem that GAO has raised regarding the program.

I hope it is not an unfair question. The GAO indicates that there may be another approach which was not, in their opinion, given sufficient consideration by FEA. They look to the report by the United States to the International Energy Agency of the existence of 120 days of oil import equivalent stock piles.

The GAO, although not analyzing in detail that 120-day stockpile, has based a criticism of the existing program on that report. Specifically, GAO indicates that while FEA claims it is misleading to assume that the U.S. industry has inventories equal to 120 days, nevertheless, that position is inconsistent with reporting to IEA of the existence of 120 days' stockpile.

Could you let the committee know what the 120 stockpile represents, whether that stockpile is available in the event of an embargo and, in view of the existence of that stockpile, what need exists for a strategic reserve program of this magnitude?

Mr. NOEL. The short answer to your question, Mr. Demarest, is that there are on a given day in this country stocks of somewhere around 850 million barrels. Those include all stocks available. In other words, they include stocks in tanks, bottoms of tanks, pipelines, and all the rest. It is our conclusion, based on our discussions with industry and others, that actually only about 60 million barrels of that total quantity, let's say 853 million barrels is a recent figure, actually available, if you will, for the uses contemplated for a strategic reserve. I will be happy to supply more detail on that for the record.

Mr. DEMAREST. Is the reporting then to IEA of the existence of 10-day stocks meaningless?

Mr. NOEL. No, I would not characterize it that way at all. The system under which we report to the IEA is different from that which we are using with respect to this insurance plan. In other words, the criteria are different.

Mr. DEMAREST. Is that related to the fact that apparently IEA allows you to include oil in barges and in the pipeline capacity as well as in tank bottoms?

Mr. NOEL. Exactly.

Mr. DEMAREST. You can't get at the tank bottoms, can you?

Mr. NOEL. You can't and keep the system operating.

Mr. DEMAREST. So the amount above the minimum level to keep the system operable is 60 million barrels, approximately?

Mr. NOEL. Yes. We use a figure of roughly 20 percent of crude oil inventories. I believe that is 60 million barrels.

Mr. DEMAREST. The rest of this, if we were to draw down, would cause the system to come to a grinding halt. You are talking about almost draining the refineries.

Mr. NOEL. Well, of course that is not what would happen on the 61st million, on the first after 60 million, but it would happen over a period of time. Presently we have safe-sided it. It is our view that only 20 percent should be counted as available for use.

Mr. DEMAREST. Perhaps I should restate that question.

If you were to draw down the entire 850 million there would not be anything left in the pipe.

Mr. NOEL. That is correct.

Mr. DEMAREST. You would have to refill that before you could begin a normal flow of petroleum products once again.

Mr. NOEL. Absolutely.

Mr. DEMAREST. Public Law 94-258, the Naval Petroleum Reserves Production Act of 1976, I believe you are familiar with a provision in that law which creates a naval petroleum reserve special account. One of the features of this account is that proceeds from sale of oil from Elk Hills and the naval petroleum reserves are credited to the account, and among other uses one of the single largest uses for which those funds may be appropriated is for the procurement of petroleum for the strategic petroleum reserve.

Could you outline what the relationship between your present funding proposal and this account is?

Mr. NOEL. It is our belief based on the figures available to us that 146 million will be available to us from that fund in fiscal year 1978. Not much more than that.

You imply in your question whether or not that oil itself might not better be used in other ways. Basically the direct revenue deriving from the sale of naval petroleum reserve oil which we think would be available for application against our expenses in fiscal year 1978 is on the order of 146 million.

As you know, that special fund also supports exploration and development of other NPR's and therefore is not totally available to us.

Mr. DEMAREST. By the end of your storage program in 1982 what proportion of the \$7.8 billion estimated cost will have been provided by this special account?

Mr. NOEL. I don't have that figure. I will be happy to provide it.
Mr. DEMAREST. Would you please, for the record?

Mr. NOEL. Yes, sir.

[The following information was received for the record:]

The estimate from the Office of Management and Budget for receipts from the naval petroleum reserves special account to offset appropriations for the Strategic Petroleum Reserve Office through 1982 is \$2,035.5 million. This total may be broken down on a yearly basis as follows:

<i>[In millions of dollars]</i>	
Fiscal year:	
1976/TQ-----	0
1977-----	400.3
1978-----	145.7
1979-----	371.4
1980-----	581.7
1981-----	390.4
1982-----	146.0

These estimates were computed in December 1976. The actual numbers will probably be higher, as the selling price of NPR oil rose by approximately \$1 in January 1977. New estimates will be available in a few months.

Among the factors which will influence the amount of funds actually received by the storage program from this account over the years are the other programs competing for the same funds. Use of the special account is authorized to offset the costs of exploration, development, production and associated activities for all the NPR's, as well as the costs of the strategic reserve.

Mr. OTTINGER [presiding]. Mr. Moffett, do you have further questions?

Mr. MOFFETT. No, Mr. Chairman.

Mr. OTTINGER. Thank you very much, Mr. O'Leary. I am sorry I was not able to be here for the beginning of your testimony. I appreciate your coming up. If you have nothing further we will excuse you and call up Mr. Monte Canfield.

Mr. MOFFETT [presiding]. Will you give your full name and identify the people who are accompanying you for the record.

STATEMENT OF MONTE CANFIELD, JR., DIRECTOR, ENERGY AND MINERALS DIVISION, GENERAL ACCOUNTING OFFICE, ACCOMPANIED BY JAMES DUFFUS III, ASSISTANT DIRECTOR, GAO OPERATIONS, FEDERAL ENERGY ADMINISTRATION; LUCILLE PERHOLTZ, AUDIT MANAGER, AND DENNIS MATTEOTTI, AUDITOR

Mr. CANFIELD. I am Monte Canfield, Jr., Director of the Energy and Minerals Division of the General Accounting Office.

I am accompanied by James Duffus III, who is the Assistant Director-in-charge of GAO operations at the Federal Energy Administration, Lucille Perholtz, audit manager, and Dennis Matteotti, auditor at the FEA site.

Mr. Chairman, as you probably have been informed by staff, we come to you with a report which we issued this morning in some haste. It was completed in substance but the procedural bureaucracy, even in the General Accounting Office, made it difficult to get it signed until about 4 o'clock yesterday afternoon.

I do not in fact have a prepared statement. What I prefer to do is to walk through some of the highlights of the digest of the report—we have made additional copies of the report available—and to then summarize my statement by highlighting a few key conclusions in the

report. I will try to be explicit as to where to look in the report so that you can walk along with me.

I would say that the work that we have done on monitoring this program started as early as April of 1976 at the explicit request, by letter, of the former Administrator of the FEA. I would say further that we have had excellent cooperation from the Federal Energy Administration throughout all aspects of our monitoring.

We are well aware of the difficulties that the FEA has had, given the time constraints that it has on it, to do this work. Nevertheless, we feel that there are three critical questions which remain unanswered for which information was not totally available to us and which would have to be answered from the point of view of this committee and the remainder of the Congress in order to come to a sensible decision as to these aspects of the petroleum reserve.

I will not go into detail on outlining what the purpose of the reserve is. I am sure Mr. O'Leary, although I didn't get here until later, went into that.

Let me start by saying that this report, if you will look on page ii of the digest, identified several issues which require further analysis and warrant consideration by the Congress before it formally approves the plan.

These issues relate to three basic questions: Is the strategic petroleum reserve of the type outlined in the Federal Energy Administration plan needed? If so, how will the oil be purchased to fill it and what ways other than general tax revenues are available to finance a strategic petroleum reserve? Mr. Chairman, this is first of perhaps a series of reports on monitoring of the strategic petroleum reserve program. We plan to continue our monitoring effort because of the magnitude of the program and its importance as a cornerstone for national energy policy.

The first question: Is there a need for the type of strategic petroleum reserve as outlined in the FEA plan? The Government-owned 500 million barrels of strategic reserve as planned by the FEA may not be needed because the potential exists for using industry crude oil and product stocks for the reserve at significant dollar savings.

As reported by the Government to the International Energy Agency, U.S. industry maintains commercially held stocks of crude oil and product equivalent to 120 days of oil imports.

This issue was addressed earlier by Mr. Demarest.

GAO has not determined the extent to which these stocks can be used to satisfy the objectives of the strategic reserve. Such a determination should be made and an adjustment made as necessary to the reserve program as currently planned. In order for these inventories to be used effectively as part or all of the strategic reserve, the Government would have to impose controls so that specified quantities of oil would be maintained and appropriately used in the event of an embargo. This system would be similar to the systems used in such countries as France and Japan.

The Federal Energy Administration agreed that further analysis is needed regarding the extent to which the industry inventories can be used during a severe supply interruption and is again studying the matter. However, the agency said it felt it would be inconsistent with the Energy Policy and Conservation Act to designate existing industry inventories as part of the reserve, and not to develop any new storage.

There were some quotations a moment ago by Mr. Noel I would like my staff to comment on because they are not consistent with some of the information that we have received. GAO believes that if these inventories are usable the Federal Energy Administration should determine the extent to which they are legally available. If additional authority is needed to allow their inclusion in the reserve, the Agency should seek from the Congress such authority.

Now, the second question is how should the reserve be filled? The FEA intends to fill the reserve through the purchase of oil on the open market at a price near the national average composite price. However, other options exist for acquiring the oil in addition to open market purchase.

Oil produced from OCS and onshore Federal leases and oil from the Elk Hills Naval Petroleum Reserve, under certain circumstances, offer substantial cost savings to the Federal Government. If price controls remain in effect significant savings can be incurred if royalty oil was taken "in kind" and used to fill part of the reserve. For the approximate 356 million barrels of royalty oil which could be taken in kind by the end of 1982 a savings of about \$3.08 a barrel totaling about \$1.1 billion would result.

In its plan FEA stated that a major reason for rejecting the purchase of royalty oil was because it would have an adverse financial impact on small refiners. However, such oil could be acquired with little or no adverse impact on those refiners. Generally the cost of crude oil to refiners is equalized by FEA's pricing regulations regardless of the actual purchase price.

We discuss that in some detail in our report. If the price of crude oil is decontrolled, on other hand, the purchase of Elk Hills oil for the reserve appears to us to be a viable option. The Federal Energy Administration ruled against purchasing Elk Hills oil because during price controls its cost would be higher than the national average composite price and there would be little or no budgetary benefit compared with purchase at world prices.

For January 1977 although the average Elk Hills selling price was \$12.31 and exceeded the projected national average composite price of \$11.73, it is below the projected world price of \$14.47. FEA maintains that under price controls, the price of domestic oil will rise to the world price. Based on information obtained by us it does appear that Elk Hills oil will remain below world prices even under decontrol.

FEA believes that using royalty oil for the reserve is undesirable but has no objection to using Elk Hills oil. The Agency position on royalty oil is that its use would result in indirectly passing on some of the reserve cost to petroleum users since higher cost foreign oil would have to be obtained by the private sector as a substitute.

The FEA points out that a particularly large share of the reserve cost would be placed on a few small refiners now obtaining a significant benefit from royalty oil.

Passing on some of the reserve cost to petroleum users should not, in our opinion, preclude the agency from using royalty oil when it would result in reducing the cost of the reserve. Minimizing reserve costs is an objective of the Energy Policy and Conservation Act. GAO disagrees that the relatively few small refiners now obtaining royalty oil would bear a particularly large share of the reserve cost, and we think we have documented that position in our report.

The final question is how should the strategic reserve be financed. The plan does not specify how the reserve is to be financed. It implies that general tax revenues, largely personal and corporate taxes, would be the source of financing. Consideration should be given to having those who would benefit directly from the reserve bear its cost. This could be accomplished through imposing a user fee. The benefits of the reserve accrue to those who buy imported crude oil and the products derived therefrom by providing protection against economic costs they would incur in the event of a supply interruption.

GAO has not analyzed all available options for imposing a fee. However, it has identified two options. A possible tariff on imported crude oil or an excise tax on gasoline. Fees collected, in our opinion, should be placed in the general fund of the Treasury and remain subject to the congressional appropriation and oversight process.

The FEA stated that, as pointed out in the plan, it is studying several options for financing the reserve including the options discussed by us.

On page 4 of our report I would reiterate in summary that FEA maintains it is misleading to assume that the U.S. industry has inventories equal to 120 days of oil imports because much of the industry inventories are not usable, and so forth. However, FEA's position in our opinion is questionable unless the United States has in fact reported emergency energy reserves to the International Energy Agency that are not in fact usable as reserves.

It is questionable to consider the 120-day stockpile as reserves for the purpose of meeting the requirement of the International Energy Agency and then disregard it in making a decision on the nature of a domestic strategic petroleum reserve. In other words, Mr. Chairman, it is difficult to see how both can be correct.

We also note that during the 1973 and 1974 oil embargo industry stocks increased rather than decreased. This was likely due to the anticipation that oil prices would rise once the embargo was lifted. The prices did in fact rise substantially. And unless the Government can require industry to draw down its stocks during future embargoes it is possible that industry will increase stocks again, going to the reserve rather than drawing them down to offset the impact of an embargo.

As far as we are concerned, the Energy Policy and Conservation Act requires FEA to establish a reserve equivalent to 90 days of crude oil imports—500 million barrels. FEA assumes that the 500 million barrels would make the United States essentially invulnerable to loss of 45 percent of its crude oil imports for approximately 180 days.

Our argument is straightforward. To the extent that the industry stockpile equivalent of 120 days of total oil imports could be used, the need for a Government-owned reserve would be reduced or eliminated. We do not know that extent. To our knowledge FEA does not actually know that extent.

On the question of using royalty oil, starting on the bottom of page 10 and top of page 11 of our report, we point out that using September 1976 figures—the latest available—there is a \$3.08 a barrel difference between the national average composite price and the price of royalty oil.

This is the difference between the price FEA would have paid to acquire oil in September 1976 under its current plan, \$11.04, and the price of royalty oil plus transportation costs of 30 cents a barrel—\$7.66 plus 30 cents. If you apply this \$3.08 savings to the 314 million or 356 million barrels of royalty oil that could be provided by the end of 1982, depending on the treatment of the 13 small refiners as discussed in our report who may have some possible hardship from this, savings would range from about \$967 million to over \$1.1 billion.

I want to point out, however, that those savings would be contingent upon royalty oil remaining under price controls.

We then have the question of oil from Elk Hills and we simply point out, and I won't point to any particular price, that we have some evidence to indicate that if prices were decontrolled because of specific circumstances on the west coast including the quality of the crude and including the questions involving the amount of oil now available on the west coast, that west coast oil prices would likely not for the foreseeable future rise to the world price. We simply site that evidence in the report.

Finally, as to the issue of how the reserve should be financed, FEA has not yet completed its analysis of this issue but we work on an assumption, discussed on page 15, that essentially revolves around a basic thesis; that is, we believe that it is reasonable to tax users of imported crude oil and products derived from it to pay the cost of the reserve.

We have not analyzed all the available options of imposing a fee or tax but we did look at a possible tariff on imported crude oil and a possible excise tax on gasoline. On page 16 you can see over the period in which the reserve would be filled the total burden upon the taxpayer in the case of a tax on gasoline would run about a cent and a half a gallon and would contribute about \$7.5 billion to the Treasury over this 5-year period.

A tariff, for example, at 60 cents a barrel would cause about a 4 percent rise in the cost of imported crude and would amount to, in terms of petroleum product, about eight-tenths of a cent a gallon in cost increases. We do not make a choice between the idea of imposing a tariff on the crude per se, or on the gasoline. The initial premise I thought about was if you impose it on gasoline you might get a double effect because it might have a conservation impact, but I must say that a cent and a half a gallon is not going to have, as far as I can tell, any kind of conservation impact. Anything short of 20 to 50 cents to a dollar is not going to have much of an impact.

Mr. Chairman, we do not have conclusions and recommendations in our report. We have, as a result of our work, identified what we consider crucial questions and we thought this committee should have the benefit of them. My staff has backup information on these points if there are any you would like elaborated on.

[Testimony resumes on p. 175.]

[The report referred to follows:]

REPORT TO THE CONGRESS



BY THE COMPTROLLER GENERAL
OF THE UNITED STATES

Issues Needing Attention In Developing The Strategic Petroleum Reserve

Federal Energy Administration

GAO's monitoring of the Strategic Petroleum Reserve Program has raised questions which need further analysis in three key areas.

FEA expects to spend up to \$8 billion to establish a Reserve of 500 million barrels of crude oil--90 days of oil imports--by 1982. Unanswered questions regarding the relationship between the type of Reserve outlined by the agency and the 120-day reserve in industry crude oil and product stocks previously reported by the Government to the International Energy Agency need further analysis.

FEA plans to fill the Reserve by purchasing oil on the open market. There are options to the agency's planned open market purchases. Specifically, under certain circumstances oil produced from Outer Continental Shelf and onshore Federal leases--on which royalties are paid--and oil from the Naval Petroleum Reserve at Elk Hills could offer substantial cost savings to the Government.

The Reserve will be financed from general tax revenues. There are alternative ways for financing. Imposition of a user fee such as a tariff on imported oil or an excise tax on gasoline would result in those benefiting from the Reserve paying for it.

EMD-77-20

FEB. 16, 1977



COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-178205

To the President of the Senate and the
Speaker of the House of Representatives

This report discusses a number of issues pertinent to the effective development of the Strategic Petroleum Reserve. The authorization of this reserve is the major action which has been legislated so far to lessen U.S. dependence on imported oil. This report is intended to aid the Congress in its consideration of the Federal Energy Administration's Strategic Petroleum Reserve Plan which was submitted for congressional approval on December 15, 1976.

We made our review pursuant to the Budget and Accounting Act of 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

Copies are being sent to Mr. James R. Schlesinger, Assistant to the President; the Director, Office of Management and Budget; the Administrator of the Federal Energy Administration; the Secretaries of Interior, State, Defense, and Navy; the Chairman, Senate Committee on Interior and Insular Affairs; the Chairman, House Committee on Interstate and Foreign Commerce; the Chairman, Subcommittee on Energy and Power, House Committee on Interstate and Foreign Commerce; and the Chairman, Subcommittee on Interior, House Committee on Appropriations.

A handwritten signature in dark ink, which appears to read "James R. Schlesinger", is written over the typed name.

Comptroller General
of the United States

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ABBREVIATIONS

FEA	Federal Energy Administration
GAO	General Accounting Office

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

ISSUES NEEDING ATTENTION IN
DEVELOPING THE STRATEGIC
PETROLEUM RESERVE
FEDERAL ENERGY ADMINISTRATION

D I G E S T

By law, the Federal Energy Administration must create a Strategic Petroleum Reserve containing an estimated 500 million barrels of crude oil and/or petroleum products by December 1982. The purpose is to diminish U.S. vulnerability to the effects of a severe interruption in energy supplies and provide short-term protection from the consequences of interruptions in petroleum product supplies.

As part of the Reserve, an Early Storage Reserve is to be established to contain at least 150 million barrels of oil or products by December 1978. The Energy Policy and Conservation Act also gives the agency the authority to establish an Industrial Petroleum Reserve and a Regional Petroleum Reserve. The quantities of oil to be contained are to be part of, and not in addition to, the Strategic Petroleum Reserve.

The Federal Energy Administration submitted its Strategic Petroleum Reserve Plan to the Congress for approval on December 15, 1976.

The proposed Reserve will contain only crude oil which will be stored underground in salt dome caverns or in mines, primarily along the Gulf Coast. The agency expects to purchase the oil through normal Federal procurement procedures at near the national average composite price. The agency does not believe establishment of industrial and regional reserves to be necessary at this time. The estimated cost to design, construct, fill, and maintain the 500 million barrel Reserve through 1982 will be between \$7.5 and \$8 billion.

GAO recognizes the newness and complexity of the Strategic Petroleum Reserve Program and the time constraint placed on the Federal Energy Administration to develop its Plan.

In this report GAO identifies several issues which require further analysis and warrant consideration by the Congress before it formally approves the Plan. The issues relate to three basic questions.

--Is a Strategic Petroleum Reserve of the type outlined in the Federal Energy Administration's Plan needed?

--If so, how will the oil be purchased to fill it?

--What ways other than general tax revenues are available to finance a Strategic Petroleum Reserve?

GAO plans to continue its monitoring of this Program because of its magnitude and importance as a cornerstone of national energy policy.

IS THERE A NEED FOR THE TYPE OF
STRATEGIC PETROLEUM RESERVE AS
OUTLINED IN THE FEDERAL ENERGY
ADMINISTRATION'S PLAN?

A Government-owned 500 million barrel Strategic Petroleum Reserve as planned by the Federal Energy Administration may not be needed because the potential exists for using industry crude oil and product stocks for the Reserve at significant dollar savings. As reported by the Government to the International Energy Agency, U.S. industries maintain commercially held stocks of crude oil and products equivalent to 120 days of oil imports. (See p. 3.) GAO has not determined the extent to which these stockpiles can be used to satisfy the objectives of the Strategic Petroleum Reserve. Such a determination should be made and adjustments made as necessary in the Strategic Reserve Program as currently planned.

In order for these inventories to be used effectively as part or all of a Strategic Reserve, the Government must impose controls so that specified quantities of oil are maintained and appropriately used in the event of an embargo. This system would be similar to the Government controlled and industry owned oil storage programs of France and Japan. (See p. 5.)

The Federal Energy Administration agreed that further analysis is needed regarding the extent to which industry inventories can be used during a severe supply interruption and is studying the matter. However, the agency stated that it would be inconsistent with the Energy Policy and Conservation Act to designate existing industry inventories as part of the Reserve and not develop any new Storage. (See p. 6.)

GAO believes that, if these inventories are usable the Federal Energy Administration should determine the extent to which they are legally available. If additional authority is needed to allow their inclusion in the Reserve, the agency should seek such authority. (See p. 6.)

HOW SHOULD THE STRATEGIC PETROLEUM RESERVE BE FILLED?

The Federal Energy Administration intends to fill the Strategic Petroleum Reserve through purchase of oil on the open market at a price near the national average composite price. However, other options exist for acquiring the oil in addition to open market purchase.

Oil produced from Outer Continental Shelf and onshore Federal leases, and oil from the Elk Hills Naval Petroleum Reserve, under certain circumstances, offer substantial cost savings to the Federal Government. If price controls remain in effect, significant savings can be incurred if such oil--on which royalties are paid--were purchased for the Reserve. For the approximately 356 million barrels of oil which could be purchased by the end of 1982, a savings of \$3.08 a barrel totaling about \$1.1 billion would result. (See p. 11.)

In its Plan the agency said a major reason for rejecting the purchase of such oil was because it would have an adverse financial impact on small refiners. However, such oil could be acquired with little or no adverse financial impact. Generally, the cost of crude oil to refiners is equalized by the agency's pricing regulations, regardless of the actual purchase price. (See p. 8.)

If the price of crude oil is decontrolled, the purchase of Elk Hills oil for the Reserve is a viable option. The Federal Energy Administration ruled against purchasing

Elk Hills oil because during price controls its cost would be higher than the national average composite price and there would be little or no budgetary benefit compared with purchases at world prices. For January 1977, although the average Elk Hills selling price of \$12.31 exceeded the projected national average composite price of \$11.73, it is below the projected world price of \$14.47. The agency maintains that under decontrol of oil prices, the price of domestic oil will rise to the world price. Based on information obtained by GAO, however, it appears that Elk Hills oil will remain below world oil prices under decontrol. (See p. 12.)

The Federal Energy Administration believes that using royalty oil for the Reserve is undesirable, but has no objection to using Elk Hills oil. The agency's position on royalty oil is that its use would result in indirectly passing some of the Reserve costs on to petroleum users since higher cost foreign oil would have to be obtained by the private sector as a substitute. The Federal Energy Administration points out that a particularly large share of the Reserve costs would be placed on a relatively few small refiners now obtaining a significant benefit from royalty oil. (See p. 13.)

Passing some of the Reserve costs to petroleum users should not preclude the agency from using royalty oil when it will result in reducing the costs of the Reserve. Minimizing Reserve costs is an objective of the Energy Policy and Conservation Act. GAO disagrees that relatively few small refiners now obtaining royalty oil would bear a particularly large share of the Reserve costs. (See p. 13.)

HOW SHOULD THE STRATEGIC PETROLEUM RESERVE BE FINANCED?

The Plan does not specify how the Reserve is to be financed; it implies that general tax revenues, largely personal and corporate income taxes, will be the source of financing. Consideration should be given to having those who will benefit directly from the Reserve bear its cost. This could be accomplished through imposing a user fee. (See p. 15.)

The benefits of the Reserve accrue to those who buy imported crude oil and the products derived therefrom by providing protection against the economic costs they would incur in the event of a supply interruption. GAO has not analyzed all available options for imposing a fee; however, it has identified two options--a tariff on imported crude oil and an excise tax on gasoline. (See p. 15.) Fees collected should be placed in the general funds of the U.S. Treasury and remain subject to congressional oversight.

The Federal Energy Administration stated that, as pointed out in the Plan, it is studying several options for financing the Reserve, including the options discussed by GAO. (See p. 16.)

CHAPTER 1INTRODUCTION

The 1973-1974 Arab oil embargo demonstrated U.S. vulnerability to interruptions in imported petroleum supplies. FEA has estimated that the embargo and accompanying oil price increases resulted in a loss of up to \$45 billion in gross national product and 500,000 jobs. Of the loss in the gross national product, FEA attributes up to \$20 billion directly to the embargo. Future interruptions would likely have more severe impacts on gross national product, employment, and price indices than the 1973-1974 embargo since the economy has become increasingly dependent on imported oil and would likely be less able to adjust to a sharp decline in petroleum supplies.

The major action taken by the U.S. to provide protection against future oil embargoes has been the creation of a Strategic Petroleum Reserve under the Energy Policy and Conservation Act (P.L. 94-163). The Act requires FEA to develop a national plan, which must provide, by December 22, 1982, a Strategic Petroleum Reserve equal to the amount of crude oil imported into the U.S. during the three consecutive highest import months of 1974 and 1975--approximately 500 million barrels. The purpose of the Reserve as stated in the Act is to diminish U.S. vulnerability to the effects of a severe energy supply interruption and provide limited protection from the short-term consequences of petroleum product supply interruptions.

The Act also requires FEA to create an Early Storage Reserve and gives the agency authority to create an industrial and a regional reserve. The quantities of oil to be contained in these reserves are to be a part of, and not in addition to, the Strategic Petroleum Reserve.

The Early Storage Reserve is to contain at least 150 million barrels of petroleum products by December 22, 1978. FEA submitted its Early Storage Reserve Plan to the Congress on April 22, 1976.

On December 15, 1976, FEA submitted its Strategic Petroleum Reserve Plan to the Congress for approval as required under the Act. The Plan details FEA's proposals for designing, constructing, and filling the Reserve. The Plan calls

for the Reserve to contain only crude oil to be stored in underground salt dome caverns or in mines, primarily located along the Gulf Coast. FEA expects to purchase the crude oil to fill the Reserve through normal Federal procurement procedures at near the national average composite price. FEA does not plan to establish industrial and regional reserves at this time. FEA estimates that through 1982, the cost to design, construct, fill, and maintain the 500 million barrel Reserve will be between \$7.5 and \$8 billion.

We recognize the newness and complexity of the Strategic Petroleum Reserve Program and the time constraint placed on FEA to develop its Plan for submission to the Congress. On April 26, 1976, the Administrator, FEA, formally requested GAO to monitor the agency's efforts in developing the Strategic Petroleum Reserve Program. GAO has been closely monitoring FEA's planning and development activities. In carrying out its work, GAO has received excellent cooperation from FEA's Office of Strategic Petroleum Reserve.

In our review of the Plan, we have identified several issues which we believe require further analysis by FEA and warrant consideration by the Congress in its deliberations over approving the Strategic Petroleum Reserve Plan. The issues identified by us relate to three basic questions.

- Is a Strategic Petroleum Reserve of the type as outlined in FEA's Plan needed?
- If so, how will the oil be purchased to fill it?
- What ways other than general tax revenues are available to finance a Strategic Petroleum Reserve?

SCOPE OF REVIEW

We interviewed FEA officials, reviewed the Strategic Petroleum Reserve Plan and related FEA records, and reviewed legislation pertinent to the Strategic Petroleum Reserve Program. We also interviewed officials of the Department of the Interior; Central Intelligence Agency; and Office of Naval Petroleum and Oil Shale Reserves, Department of the Navy.

GAO plans to continue its monitoring of the Strategic Petroleum Reserve Program because of its magnitude and importance as a cornerstone of national energy policy.

CHAPTER 2IS THERE A NEED FOR THE TYPE OF STRATEGIC
PETROLEUM RESERVE AS OUTLINED IN FEA'S PLAN?

GAO has supported the concept of a system of national emergency energy reserves to guard against future disruption of oil imports. GAO continues to support the concept. However, at this point, we believe unanswered questions still exist regarding whether the Strategic Petroleum Reserve Program as outlined in FEA's Plan is the most efficient approach. FEA's approach calls for the creation of a new centralized, Government-owned and controlled Reserve. With 500 million barrels of oil, this Reserve would make the U.S. essentially invulnerable to a loss of 45 percent of its imports for approximately six months. FEA cost estimates for such a Reserve are between \$7.5 and \$8 billion.

We believe that another approach may be available for creating a Reserve which was not given sufficient consideration by FEA. This approach relates to the use of industry crude oil and product stocks. To the extent that industry stockpiles could be used to offset the purchase of 500 million barrels of oil and related storage facilities, significant savings would result to the Federal Government.

Entirely separate from the new Strategic Petroleum Reserve Program, U.S. industries maintain commercially held stocks of crude oil and products equivalent to 120 days of oil imports. The U.S., through the Department of State, reported these stocks to the International Energy Agency, founded in November 1974 by 19 industrial oil-consuming nations. These nations entered into an Agreement on an International Energy Program to reduce members' vulnerability to oil supply interruptions through emergency allocation planning, encouragement of energy conservation measures, and the maintenance of oil stockpiles. Under the agreement, member countries are required to maintain emergency reserve stockpiles equivalent to at least 60 days of oil imports and are to increase these stockpiles to an equivalent of 90 days of oil imports by 1980. The U.S., however, has reported its stockpiles to be well in excess of these requirements.

According to the agreement, the oil stockpiles may be satisfied by

- oil stocks,
- fuel switching capacity, and
- stand-by oil production.

Oil stocks include crude oil, major refined petroleum products, and unfinished oils stored in refinery tanks, bulk terminals, pipeline tankage, barges, intercoastal tankers, oil tankers in port, inland ship bunkers, and storage tank bottoms. They also include working stocks and stocks held by large consumers as required by law or otherwise government controlled. Stocks excluded are crude oil not yet produced and crude oil, major refined petroleum products, and unfinished oils held in pipelines, rail and truck tank cars, sea-going ship bunkers, service stations, retail stores, and tankers at sea. Also, excluded are stocks held by other consumers and the military.

Fuel switching capacity is defined as normal oil consumption that can be replaced by other secure fuels in an emergency. In addition, this capacity must be (1) subject to government control in an emergency and (2) able to be brought into operation within one month.

Stand-by oil production is defined as a member country's potential domestic oil production in excess of normal oil production. This production must be subject to government control and be able to be brought into use during an emergency.

We did not analyze in detail the 120-day oil stockpile reported by the U.S. to the International Energy Agency nor the extent to which it can be used to satisfy the objectives of the Strategic Petroleum Reserve Program.

FEA maintains that it is misleading to assume that U.S. industry has inventories equal to 120 days of oil imports because much of industry inventories are not usable and are required just to keep the distribution system functioning, e.g., oil in pipelines, domestic ships and barges in transit, tank bottoms, etc. However, FEA's position is questionable, unless the U.S. has reported emergency energy reserves to

the International Energy Agency that are not in fact usable as reserves. It is questionable to consider the 120-day stockpile as reserves for the purpose of meeting the requirements of the International Energy Agency and then disregard it in making a decision on the nature of a domestic Strategic Petroleum Reserve.

To the extent the stockpiles and the facilities included in the 120-day stockpile are usable, Government costs of the Strategic Petroleum Reserve Program would decrease. Additionally, it would appear that the Program would be accelerated and environmental problems associated with facility construction reduced.

At present, the Government has no control over industry inventories. However, if these inventories are to be used for the Strategic Reserve, then Government controls must be imposed to insure that specified quantities of oil are maintained and that they will be appropriately used in the event of an embargo. During the 1973-1974 oil embargo, industry stocks increased rather than decreased. This was likely due to the anticipation that oil prices would rise once the embargo was lifted. The prices did, in fact, rise substantially; and, unless the Government can require industry to draw down its stocks during future embargoes, it is possible that industry will increase stocks again rather than draw them down to offset the impact of an embargo.

While such authority does not now exist, the concept of a government controlled/industry owned oil storage program is not new. Government controlled/industry owned oil storage programs currently exist in other countries, but responsibility and control of these programs involve a variety of relationships. While West Germany is a combination of government and industry control, France and Japan control the storage facilities with industry owning and operating them. By contrast, the Strategic Petroleum Reserve Program as proposed by FEA will be owned and operated by the Federal Government.

The U.S. would have to adopt a relationship similar to that of the programs of France and Japan if it chooses to use the industry stockpiles in lieu of, or as a part of, the Strategic Petroleum Reserve Program.

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In commenting on a draft of this report, FEA agreed that further analysis is needed regarding the extent to which industry inventories can be used during a severe supply interruption and stated that it is now undertaking a major study for this purpose. FEA stated that this analysis may impact future decisions regarding the ultimate size of the Reserve if it is concluded that more or less reliance should be placed on industry inventories as a partial substitute for the Reserve. FEA expressed concern, however, that the draft report suggested that it should have considered existing industry inventories for part or all of the Reserve.

FEA stated that it believes the intent of the Energy Policy and Conservation Act is to provide for additional petroleum storage over and above the amounts normally maintained by industry. FEA further believes it would be inconsistent with the Act to simply designate existing industry inventories as part of the Reserve and not develop any new storage.

As discussed above, and as agreed to by FEA, GAO believes that further analysis is needed to determine the extent to which the 120-day industry stockpile, as reported to the International Energy Agency, is usable in lieu of, or as part of, the Strategic Petroleum Reserve. If these inventories are usable, FEA should determine the extent to which they are legally available consistent with the requirements of the Energy Policy and Conservation Act. If additional authority is needed to allow their inclusion in the Reserve, FEA should seek such authority.

The Energy Policy and Conservation Act requires FEA to establish a Reserve equivalent to 90 days of crude oil imports--500 million barrels. FEA assumes that the 500 million barrels would make the U.S. essentially invulnerable to a loss of 45 percent of its crude oil imports for approximately 180 days. However, to the extent the industry stockpile equivalent to 120 days of total oil imports could be used, the need for a Government-owned Reserve would be reduced or eliminated.

CHAPTER 3HOW SHOULD THE STRATEGIC PETROLEUMRESERVE BE FILLED?

FEA intends to fill the Reserve by purchasing oil on the open market at a price near the national average composite price through sale proposals from all potential oil sellers--both foreign and domestic. We believe that other opportunities exist in addition to or in lieu of open market purchase. We have identified the following:

- acquisition of royalty oil produced from Outer Continental Shelf and onshore Federal leases, and
- acquisition of oil from the Elk Hills Naval Petroleum Reserve.

ACQUISITION OF ROYALTY OIL

Royalty oil from Federal Outer Continental Shelf and onshore oil leases could be used--directly or through exchange agreements--for filling the Reserve. Under applicable laws, the Federal Government may collect all royalties in kind, i.e., as oil or natural gas, from Outer Continental Shelf and onshore Federal oil producing properties. According to officials of the Department of the Interior, the Federal Government presently collects less than 50 percent of its oil royalties in kind. These officials advised us that for fiscal year 1976, if the Federal Government had collected all of its oil royalties in kind, it would have collected about 74 million barrels. Royalty oil production is expected to remain about the same through 1982.

During fiscal year 1976, the Federal Government collected about 34 million barrels of oil in lieu of royalty payments. It sold this oil to small refiners at an average price of \$7.59 a barrel--the average price for total royalty oil production. As of September 1976, the most current information available, the average price for a barrel of royalty oil was \$7.66. As of January 1977, 55 small refiners had contracts with the Department of the Interior to purchase royalty oil. Most of these small refiners do not physically take possession

of the royalty oil because they are not located near the royalty oil producing properties. Instead, they enter into exchange agreements with other refiners to exchange their royalty oil for oil which is more accessible to them.

FEA considered acquiring royalty oil for filling the Reserve and concluded that it is not as desirable as the currently planned oil purchase policy. Reasons for this conclusion as stated in the Plan were:

- It would adversely impact financially on small refiners now relying on access to royalty oil.
- It would be necessary to terminate existing Interior Department royalty oil contracts to use this oil.
- The supply of royalty oil is not sufficient for the Strategic Reserve, and even if this approach were adopted, other oil would be required.
- Transportation costs for moving this widely dispersed oil to any market will be substantially greater than the cost of unloading ocean tankers into Reserve facilities.

The reasons cited by FEA, in our opinion, do not adequately reflect the royalty oil situation, as discussed below.

Adverse Financial Impact on Small Refiners

We believe that royalty oil could be used for the Reserve with little or no adverse financial impact on small refiners. Generally, the cost of crude oil to refiners is equalized by FEA pricing regulations, regardless of the actual purchase price.

FEA's crude oil pricing regulations are designed to substantially equalize average crude oil costs at the refinery level through the use of entitlements which permit refiners to share the benefits associated with access to price controlled crude oil. Under the regulations, all refiners

report monthly to FEA their volume of crude oil processed and the volume of price controlled oil included in the refiners' crude oil receipts. FEA issues each refiner enough entitlements to permit it to process the national average ratio of price controlled oil to total crude oil processed. Generally, refiners with a ratio of price controlled oil higher than the national price controlled oil supply ratio must buy entitlements to cover the excess; whereas, refiners with a lower ratio must sell entitlements for the amount they are under the national ratio. Therefore, the average cost to refiners with less than the average amount of price controlled oil is reduced because of the money they receive from the sale of entitlements. On the other hand, costs to those who process more than the average price controlled oil ratio are increased because they must purchase entitlements.

The regulations also contain an entitlement adjustment for small refiners in addition to the entitlements otherwise issued to them which grant them access to price controlled crude oil. According to an FEA official, this adjustment allows small refiners to acquire oil, on the average, for \$.54 a barrel less than the cost of oil to other refiners after entitlements.

The sales price of entitlements is determined by FEA each month based on the difference between the weighted average cost of decontrolled oil (imported oil, stripper well oil and oil produced from the Naval Petroleum Reserves) less \$.21 ^{1/} less the weighted average cost of price controlled oil.

FEA, however, grants to small refiners "exceptions relief" from the regulations when they can demonstrate that compliance with the program would cause them financial hardship. Exceptions relief means that these refiners do not have to buy entitlements if they have more price controlled oil than the national ratio. As a result, their crude oil costs, on the average, are lower than those of other refiners.

Currently, there are 19 small refiners who are getting full or partial exceptions relief. As of mid-January 1977, 13 of these refiners had contracts with the Department of the

^{1/}The \$.21 is the amount fixed by FEA regulation to give domestic oil a price advantage over imported oil (and decontrolled oil) and thus provide refiners an incentive to purchase domestic oil.

Interior to purchase royalty oil. These contracts are all scheduled to expire in mid-1979 and total 32,399 barrels a day or about 12 million barrels a year. It is apparent, therefore, that only the refiners getting exceptions relief and having royalty oil contracts would be adversely affected--13 of 55 small refiners--if royalty oil were not available to them and they could not obtain comparable priced oil elsewhere. Other refiners with royalty oil contracts would not be adversely affected--42 of 55 small refiners--because their prices are, in effect, equalized by FEA's pricing regulations.

Termination of Existing Royalty Oil Contracts

In its Plan, FEA stated that use of royalty oil would require the termination of existing Interior Department royalty oil contracts with refiners. As pointed out above, of the 74 million barrels of royalty oil produced in 1976, only 34 million barrels were sold under contract to small refiners. All of these contracts are scheduled to expire by mid-1979. Until mid-1979, the royalty oil not under contract--40 million barrels--could be used for the Reserve. After mid-1979, the additional 34 million barrels could be used, making the total annual royalty oil production of 74 million barrels available for use.

Royalty Oil Supply

FEA in its Plan stated that the supply of royalty oil is not sufficient for the 500 million barrel Strategic Petroleum Reserve, and even if this approach were adopted, other oil would have to be purchased. We agree with FEA on this position. However, in our view there is a substantial supply of royalty oil available and to the extent that royalty oil is acquired, significant cost savings to the Federal Government would result as discussed below.

Assuming the 13 small refiners' contracts totaling 12 million barrels a year are not terminated before their mid-1979 expiration date and not renewed; royalty oil could provide 356 million of the 500 million barrels for the Reserve by the end of 1982, based on FEA's schedule for filling the Reserve. If, on the other hand, their contracts were renewed after mid-1979, royalty oil could provide 314 million barrels.

The cost savings associated with the purchase of royalty oil are very significant when compared to the purchase of oil

at the national average composite price and are greater still when compared to the world price. Comparing costs for September 1976--the most current month for which royalty oil prices are available--the per barrel savings associated with acquiring royalty oil rather than acquiring oil under FEA's current plan would be \$3.08. This is the difference between the price FEA would have paid to acquire oil in September 1976 under its current plan (\$11.04) and the price of royalty oil plus transportation costs (\$7.66 + \$.30). Applying this \$3.08 savings to the 314 or 356 million barrels of royalty oil that could be provided by the end of 1982 (depending on the treatment of the 13 small refiner contracts), savings would range from about \$967 million to \$1.1 billion.

It should be pointed out, however, that the savings are contingent upon royalty oil remaining under price controls. Royalty oil is priced significantly below the national average composite price because it is subject to price controls. Therefore, as long as price controls remain in effect, acquiring royalty oil for filling the Reserve will result in significant savings.

Transportation Costs for Royalty Oil

In its Plan FEA stated that transportation costs for moving royalty oil to any market will be substantially greater than the cost of unloading ocean tankers into Reserve facilities because royalty oil is more widely dispersed. In our view, the more valid approach would be to compare the costs of transporting royalty oil to storage facilities on the Gulf Coast with the costs of transporting the oil FEA plans to purchase to the same storage facilities. In any event, as pointed out above, the total cost of purchasing royalty oil including transportation costs of \$.30--FEA's estimated average transportation cost for domestic oil--is substantially less than the national average composite price of oil. Additionally, if royalty oil were acquired for the Reserve, the Federal Government would not be precluded from entering into exchange agreements with other refiners to trade the royalty oil for oil which is more accessible to the storage sites.

ACQUISITION OF ELK HILLS OIL

Elk Hills Naval Petroleum Reserve contains estimated reserves of 1.2 billion barrels of oil. Under its current

development plan the Navy expects Elk Hills to reach its maximum efficient rate of production of 300,000 barrels a day by April 1979. Elk Hills oil is free of price controls under the Naval Petroleum Reserves Production Act of 1976 (P.L. 94-258), and is sold competitively on the open market. In our view, contingent upon decontrol of oil prices and Elk Hills oil remaining below the world oil price, Elk Hills oil has the potential for filling a portion of the Reserve at considerable cost savings to the Federal Government.

FEA does not expect to use Elk Hills oil to fill the Reserve because it would have higher budget costs than the national average composite price during price controls and would have little or no budgetary benefit compared with purchases at world market prices.

Based on pricing data obtained from FEA, the projected national average composite price of crude oil for January 1977 is \$11.73 a barrel. This is below the Navy's average January 1977 selling price for Elk Hills oil of \$12.31 a barrel. Therefore, at this time, Elk Hills oil is more expensive than oil purchased at the national average composite price.

FEA stated in its Plan that use of Elk Hills oil would have little or no budgetary benefit compared with oil purchased at world market prices. Elk Hills oil, however, is priced below the world price. The projected January 1977 world oil price is \$14.47 a barrel compared to the average Elk Hills January 1977 sale price of \$12.31 a barrel.

FEA has stated that, if domestic prices are decontrolled, domestic oil will rise to the world price. However, based on information obtained by us, it appears that Elk Hills oil, under decontrol, will remain below world prices. We were advised by an official of the Office of Naval Petroleum and Oil Shale Reserves, Department of the Navy, that West Coast decontrolled crude oil prices have historically been below average domestic decontrolled crude oil prices and are expected to remain lower primarily due to the excess oil supply on the West Coast. Given that excess, Elk Hills oil would be expected to be priced below the world price. According to Navy and FEA officials, California producers have been complaining that they have had to shut in producing wells because refiners were canceling contracts with them and purchasing Elk Hills oil.

FEA, in commenting on a draft of this report, stated that although using royalty oil to fill the Reserve is undesirable, it has no objection to purchasing Elk Hills oil.

With respect to royalty oil, FEA stated that the issue of whether to use royalty oil is not really a question of how to fill the Reserve but part of the question of how the Reserve should be financed. FEA commented that using royalty oil would be an undesirable approach because of the inequitable distribution of the impact and the potential disruption of established supply relationships for small refiners. FEA's position is that using royalty oil for the Reserve would be an indirect way of passing some of the Reserve costs on to petroleum users since higher cost foreign oil would have to be obtained by the private sector as a substitute. In this case, FEA points out that a particularly large share of the Reserve costs would be placed on a relatively few small refiners now obtaining a significant benefit from royalty oil.

FEA's statement that use of royalty oil would indirectly pass some of the Reserve costs on to petroleum users may be true; however, this should not preclude the agency from using royalty oil when it will result in reducing Reserve costs. In this connection, the Energy Policy and Conservation Act requires that FEA, to the greatest extent practicable, acquire petroleum products for the Reserve with the objective of minimizing its costs. We believe that royalty oil, when purchased at costs less than FEA would otherwise have to pay, is consistent with that objective.

As far as the indirect financing issue which the agency believes would exist, we believe it to be part of a broader question of how the Reserve should be financed which is discussed in Chapter 4. FEA's position that use of royalty oil would be undesirable for the reasons stated appears inconsistent with its Plan which concludes that if changes in the availability or the cost of royalty oil make it attractive, FEA will use it to meet a portion of Reserve requirements. This conclusion was reaffirmed by the Administrator, FEA, on February 4, 1977, in hearings on the Plan before the Senate Committee on Interior and Insular Affairs.

Contrary to FEA's position that use of royalty oil would result in inequitable distribution of the impact and place a large financial burden on a relatively few small refiners, we believe this not to be the case. As discussed

on page 8 of this report, royalty oil could be used for the Reserve with little or no adverse financial impact on small refiners. Royalty oil contracts for the 13 small refiners receiving exceptions relief from FEA's entitlements program need not be terminated. In addition 40 million barrels of royalty oil are produced annually which are not being sold under contract to small refiners. In any event, all contracts that small refiners currently have with the Federal Government to purchase royalty oil are scheduled to expire in mid-1979.

With respect to use of Elk Hills oil, FEA stated that it has no objection to purchasing Elk Hills oil, to the extent it is suitable for storage and it costs no more than other available oil. FEA further stated that it would make cost comparisons as it proceeds with the purchase of oil for the Reserve.

We agree that cost comparisons should be made. Additionally, we believe that Elk Hills oil is suitable for Reserve storage. We were advised by an official of the Navy's Office of Naval Petroleum and Oil Shale Reserves, that 75 percent of Elk Hills oil production will be of the quality specified by FEA in its Plan as being the most desirable for Reserve storage.

CHAPTER 4

HOW SHOULD THE STRATEGIC PETROLEUMRESERVE BE FINANCED?

FEA's Plan does not explicitly state how the Reserve will be financed; however, it implies that the Reserve will be funded from general tax revenues. We believe that consideration should be given to having those who will benefit directly from the Reserve bear its cost. In our view this can be accomplished through imposition of a user fee, such as a tariff on imported oil or an excise tax on gasoline.

If the Strategic Petroleum Reserve Plan is implemented the costs will be great. FEA estimates that the 500 million barrel Reserve will cost between \$7.5 and \$8 billion. As discussed in Chapter 3, the costs could be reduced by acquiring royalty oil or Elk Hills oil to fill the Reserve. Even if Government-owned crude oil is used, substantial cost will be involved to create the Reserve.

FEA's Plan implies that general tax revenues, largely personal and corporate income taxes, will be the source of financing for the Reserve. However, it is both efficient and equitable to pay for public services through "user fees" when the users of a service can be identified and the fee collection is administratively feasible. The Strategic Petroleum Reserve is an insurance policy for all U.S. buyers of imported crude oil and through them, all consumers of petroleum products. It "insures" those who buy imported crude oil (and products derived therefrom) against the economic costs they would incur in the event of a disruption in supply. It may also prevent embargoes from occurring at all. The benefits of this insurance and protection are directly received by the users of imported crude oil and petroleum products. We believe that it is reasonable to tax users of imported crude oil and the products derived from it to pay the costs of the Reserve. While we have not analyzed all available options for imposing such a fee or tax, we have identified two such options for consideration--a tariff on imported crude oil and an excise tax on gasoline.

There may be several ways to establish a user fee. Perhaps the simplest would be a flat rate indexed to inflation. A flat rate could be imposed for a set period, i.e., five years, and be renewed only if collections were insufficient to cover actual Reserve Program expenditures plus

any expected additional costs. For instance, if imports averaged 2.5 billion barrels annually over the next five years which is slightly less than 1980 projections, a tariff of \$.60 a barrel would result in \$7.5 billion being collected over a five-year period. In the case of an excise tax on gasoline, if gasoline consumption were to remain at current levels--105 billion gallons annually--over the next five years, an excise tax of 1.5 cents a gallon would result in over \$7.5 billion being collected in a five-year period. Actual collections would depend both on the amount of the tariff or excise tax and the quantity of oil imported or gasoline consumed. It is our view that the fees collected should be placed in the general funds of the U.S. Treasury and remain subject to congressional oversight.

A tariff of \$.60 a barrel would cause about a 4 percent rise in the cost of imported crude oil. Under FEA's entitlements program, this increase would, in effect, be spread equally among refiners purchasing domestic as well as imported crude oil, and the additional costs would be passed through ultimately to all users of petroleum products. This price increase would have a modest upward impact on domestic prices of petroleum products, probably about 0.8 cents a gallon.

Both a tariff and an excise tax are advantageous in that they are administratively feasible to collect. A tariff on imported oil would be more equitable than an excise tax on gasoline. The tariff would ultimately be paid by all consumers of petroleum products and, therefore, by those who would directly benefit from the Reserve. However, the excise tax would place the cost burden only on consumers of gasoline. The tariff is an indirect tax on consumers; whereas, the excise tax is a direct tax and more visible to the consumer.

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In commenting on a draft of this report, FEA stated that, as pointed out in the Plan, it is now studying several options for financing the Reserve, including the two options discussed by GAO.

CHAPTER 5SUMMARY

FEA is required to create a Strategic Petroleum Reserve containing an estimated 500 million barrels of crude oil and/or petroleum products by December 1982. On December 15, 1976, FEA submitted its Strategic Petroleum Reserve Plan to the Congress for approval. This Plan details FEA's proposals for designing, constructing, and filling the Reserve. The Plan states that the Reserve will contain only crude oil which will be stored underground in salt dome caverns or in mines, primarily along the Gulf Coast. FEA expects to purchase the crude oil through normal Federal procurement procedures at near the national average composite price. FEA states in the Plan that the estimated cost to design, construct, fill, and maintain the 500 million barrel Reserve through 1982 will be between \$7.5 and \$8 billion. These funds will be generated from general tax revenues.

We believe reasonable questions exist as to the need for a Reserve of the type outlined in FEA's Plan. In our view, far more serious consideration needs to be given to the potential for using industry crude oil and product stocks for the Reserve.

The U.S. Government, through the Department of State, has reported to the International Energy Agency that U.S. industries have crude oil and product stocks equivalent to 120 days of oil imports. We do not know the extent to which it is feasible to use the entire 120-day industry stockpile for the Reserve. However, we believe the extent to which these reserves could be used should be determined and adjustments made as necessary in the Strategic Petroleum Reserve Program as currently planned by FEA. In order for these inventories to be used effectively as part or all of a Strategic Reserve, the Government must impose controls to insure that specified quantities of oil are maintained and that they will be appropriately used in the event of an embargo.

FEA agrees that further analysis is needed regarding the extent to which industry inventories can be used during a severe supply interruption and is studying the matter. However, FEA believes that it would be inconsistent with the Energy Policy and Conservation Act to designate existing industry inventories as part of the Reserve and not develop any new storage.

We believe that, if these inventories are usable, FEA should determine the extent to which they are legally available. If additional authority is needed to allow their inclusion in the Reserve, FEA should seek such authority.

FEA plans to purchase oil for the Reserve at near the national average composite price. We believe that alternative oil purchase options should be considered; specifically, royalty oil produced from the Outer Continental Shelf and onshore Federal leases and oil from Elk Hills. We believe that as long as price controls remain on domestic oil, royalty oil could be acquired to fill the Reserve and would result in significant dollar savings with little or no adverse financial impact on small refiners currently contracting for royalty oil.

At current prices, acquisition of Elk Hills oil to fill the Reserve is a more costly approach than oil acquired under FEA's current plans. However, if domestic oil is decontrolled and reaches the world price, we believe Elk Hills oil is a desirable alternative if its price continues to remain below the world price.

FEA believes that using royalty oil for the Reserve is undesirable, but has no objection to using Elk Hills oil. FEA's position on royalty oil is that its use would result in indirectly passing some of the Reserve costs on to petroleum users since higher cost foreign oil would have to be obtained by the private sector as a substitute. FEA points out that a particularly large share of the Reserve costs would be placed on a relatively few small refiners now obtaining a significant benefit from royalty oil.

Passing some of the Reserve costs to petroleum users should not preclude FEA from using royalty oil when it will result in reducing the costs of the Reserve. Minimizing Reserve costs is an objective of the Energy Policy and Conservation Act. We disagree that relatively few small refiners now obtaining royalty oil would bear a particularly large share of the Reserve costs.

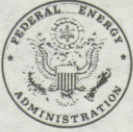
FEA plans to finance the Reserve from general tax revenues. We believe that it may be more efficient and equitable to have those who will benefit directly from the Reserve bear its costs. This could be accomplished through

imposing a user fee such as a tariff on imported oil or an excise tax on gasoline. In addition, it is GAO's view that the fees collected should be placed in the general funds of the U.S. Treasury and remain subject to congressional oversight.

FEA is studying several options for financing the Reserve, including the options discussed by GAO.

APPENDIX I

APPENDIX I



FEDERAL ENERGY ADMINISTRATION

WASHINGTON, D.C. 20461

10 FEB 1977

OFFICE OF THE ASSISTANT ADMINISTRATOR

Mr. Monte Canfield, Jr.
Director
Energy and Minerals Division
General Accounting Office
Washington, D. C. 20548

Dear Mr. Canfield:

This letter is to confirm the key comments that we provided to your staff on February 9, regarding the General Accounting Office's draft report on the Strategic Petroleum Reserve (SPR).

Our principal comments are as follows:

1. Use of Industry Inventories

The draft report suggests that the Federal Energy Administration (FEA) should have considered using existing industry inventories for part or all of the SPR. FEA believes that the intent of the Energy Policy and Conservation Act was to provide for additional petroleum storage, over and above the amounts normally maintained by industry. We believe it would not be consistent with the Act to simply designate existing industry inventories as part of the SPR and not develop any new storage.

We agree, however, that further analysis is needed regarding the extent to which industry inventories can be utilized during a severe supply interruption. We are now undertaking a major study of industry inventories for this purpose. This analysis may impact future decisions regarding the ultimate size of the Reserve if it is concluded that we should place more or less reliance on industry inventories as a partial substitute for the Reserve. The current SPR Plan proposes to place considerable reliance on industry inventories, as discussed in Chapters II and V.

2. Use of Royalty Oil

The issue of whether to use royalty oil is not really a question of how we fill the Reserve. It is a part of the question of how the Reserve should be financed. If FEA were to use royalty oil for the Reserve it would simply be an indirect way of passing some of the SPR costs along to petroleum users. If FEA used the low cost royalty oil, higher cost foreign oil would have to be obtained by the private sector as a substitute. In this case, a particularly large share of the SPR costs would be placed on a relatively few small refiners who now obtain a significant benefit from the royalty oil.

We are now studying several possible options for financing the SPR, but we believe that using royalty oil would be an undesirable approach because of the inequitable distribution of the impact and the potential disruption of established supply relationships for small refiners.

3. Use of Elk Hills Oil

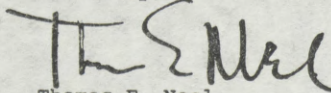
As explained to your staff, FEA has no objection to purchasing Elk Hills oil, to the extent it is suitable for SPR storage, if it costs no more than other oil available for storage. We will make these cost comparisons as we proceed with the purchase of oil for the SPR.

4. Financing the Reserve

As we stated in the SPR Plan, FEA is now studying several options for financing the Reserve Program, including the two options suggested in your report.

We appreciate the opportunity to comment on the draft report, and we look forward to the continued useful input from your staff on this important Program.

Sincerely,



Thomas E. Noel
Assistant Administrator
Strategic Petroleum Reserve

APPENDIX II

APPENDIX II

PRINCIPAL OFFICIALSRESPONSIBLE FOR ADMINISTERING ACTIVITIESDISCUSSED IN THIS REPORTTenure of OfficeFromToFEDERAL ENERGY ADMINISTRATION

ADMINISTRATOR:

John F. O'Leary	Feb. 1977	Present
Gorman C. Smith (Acting)	Jan. 1977	Feb. 1977
Frank G. Zarb	Dec. 1974	Jan. 1977
John C. Sawhill	Apr. 1974	Dec. 1974
William E. Simon	Dec. 1973	Apr. 1974

Mr. MOFFETT. Thank you, Mr. Canfield. The subcommittee is most appreciative of what is going to be a very valuable report to the subcommittee, particularly the assertions that counter some of the things that the FEA representatives had to say in regard to royalty oil and other matters.

The Chair would ask the permanent chairman of the subcommittee if he wishes to ask a question at this time.

Mr. DINGELL. Thank you, Mr. Chairman. I would be content to defer for awhile.

Mr. MOFFETT. With regard to your contention on the second page of the report, is there need for a type of strategic petroleum reserve as outlined in the FEA plan? You say that,

GAO has not determined the extent to which these stockpiles can be used to satisfy the objectives of the strategic petroleum reserve. Such a determination should be made and adjustments made as necessary in the SPR as currently planned.

Is GAO capable of making that kind of determination?

Mr. CANFIELD. I don't think that that would be an appropriate role for us. I think that the Federal Energy Administration is certainly capable of making that kind of determination. Maybe the staff would like to discuss what information we think we have. I know that we are capable, after FEA has made such a determination, of going in and auditing the validity of the assumptions upon which their determination was made. It might be useful for Mr. Duffus or Mrs. Perholtz to tell you something about the basis for the 15-percent estimate that the FEA quoted to you today and to give you a little feeling for the criteria upon which the U.S. Government allegedly made its presentation to the International Energy Agency as to what things were available.

Those criteria do not in fact include all stocks. Perhaps my staff would like to elaborate on that.

Mr. DUFFUS. Mr. Chairman, on page 4 of our report we point out the types of oil stockpiles that may be included according to the International Energy Agreement. It details the oil stocks that are included and also points out the oil stocks that are excluded.

According to the agreement, among the stocks excluded are crude oil, unfinished oil, and major refined products that are in the pipeline. There are some more exclusions listed on page 4. I think a critical question that needs to be addressed is what sort of stocks are needed to keep the distribution system functioning.

We understand that the information, the 15-percent estimate that Mr. Canfield referred to, was obtained by FEA based on existing available data and based on contacts with industry. We believe that further analysis is necessary to exactly determine to what extent this oil stockpile is usable.

Mr. CANFIELD. I think the question boils down to did FEA go out and make an independent assessment?

For example, excluded from the stocks that would have been allowed to have been reported to the IEA are such stocks as not yet produced crude, major refined products, unfinished oils held in pipelines, rail and truck tankcars, seagoing ship bunkers, service stations, retail stores, tankers at sea, military stocks, and stocks held by small consumers.

We are not talking about the stocks you can't get at. The criteria are clear. You have to be able to switch it in an emergency under Government control, within a month. The U.S. Government was supposed to have only reported to the IEA stocks which could meet those criteria.

The 15-percent figure was derived as we understand it from information which was on hand and information which was received by asking the industry how much they could give up in an emergency. But there is no evidence one way or the other that industry would come grinding to a halt.

We are not arguing that we know that 120 days of stocks are available. We are arguing that the Government does not know how much, anything from nothing to all, is available. Some of that has to be available because they both can't be right. The Government cannot be making comments to the International Energy Agency on the one hand through the State Department on information furnished by FEA and then turn around on the other hand and say their stocks cannot be used so we have to have our own federally financed reserve. That is the open question. GAO is not equipped to do that work.

Mr. MOFFETT. Let me interrupt you to do something that may be helpful.

Mr. Noel, could we ask you to come back to the table and join in this discussion? We may direct, as a result of this report, some inquiries in writing through its chairman but it may be helpful to have an exchange here.

Mr. CANFIELD. I think that is fine. I want you to know in all the time we have dealt with the FEA we have never had closer and better cooperation with any part of that administration or with any group than we have had with the FEA on this subject.

We are not talking about issues here of fundamental conflict. We are talking about questions that we have raised and that they are trying to address to our staff. We have given them a complete briefing on this report several times. I encourage this dialog.

Mr. MOFFETT. Let's have that dialogue, then. Did you hear the question?

Mr. NOEL. Yes, sir. It is our belief that the 120 days of inventories that is in question here includes oil in refining tanks, pipeline tankage, barges, intercoastal tankers, oil tankers in port and all working stocks.

In other words, I am not saying all of the 120 days is in tanks somewhere and you can't get it out because of the pipelines. What I am saying is that at any given point in time today there are 120 days of stocks but that is distributed all through the system, barges on the intercoastal waterway, ships in transit up the east coast full of product.

I previously used a figure indicating that based on the questions we have asked the industry and our own studies that we think something on the order of 60 million barrels is all that we should count on as being excess to the operating requirement.

It is always true that during an emergency whether it is a supply emergency of severe proportions such as an embargo or one that we are facing today—I understand the barges are moving again now on the Ohio but there are conditions on any given day that vary.

These stocks go up and down from season to season, the relationship of one portion of stock to another. Information available to us does indicate that all of these categories are U.S. oil, it is within U.S. borders and therefore I think it is legitimate to include that as part of our stocks for purposes of the IEA requirement, because it is usable in that sense. We don't think, though, that it represents what we regard as the incremental stocks that are needed in the unusual circumstances such as a severe supply interruption.

Mr. MOFFETT. What is the significance of reporting 120 days to the IEA? Does that really make sense? What kind of message do we convey?

Mr. NOEL. If I might touch on the philosophy of the storage program itself. It is my understanding that the purpose of the strategic reserve was to meet the unforeseen circumstances of a severe interruption, not to presume that we are willing to accept a change of less oil on a daily basis.

I think that is the basis of the question asked by you and Mr. Markey, for example. The SPR plan as written presumes less than a 3 percent conservation factor. In other words, we fully understand that we can do certain things.

For example, we probably could draw down these stocks and say, "Aha, we have already met our commitment to the strategic reserve." Or we could say we are willing to go immediately on the first day of the embargo to a 10-percent conservation program that might involve and probably would involve rationing.

We have presumed just exactly the opposite of that. We have concluded that our mandate from the Congress is essentially to establish insulation against the kind of traumatic impact on the economy that occurred during the last interruption. What I am saying is this, that we are assuming practically a business as usual situation, certainly within 3 percent, that the economy would continue to operate at something like its level before the embargo even began.

Mr. MOFFETT. When you say our assumption, do you mean the people preparing the SPR or do you mean FEA, because your program can be dramatically influenced by other things that FEA and Mr. Schlesinger decide to do.

Mr. NOEL. Yes, sir. I am using "our" in its broadest sense. I believe it was the administration's position at the time the plan was prepared that the assumptions which have been supplied, which would be a 45-percent curtailment, not more than 3-percent conservation.

Mr. MOFFETT. That was not the Carter administration.

Mr. NOEL. No, sir.

Mr. MOFFETT. It is fair to say that this administration might have a different priority in regard to conservation than the last one.

Mr. NOEL. Yes, I think that is true except that I believe the basic philosophy we are discussing is that this program as I understand it was intended essentially to maintain a business-as-usual posture, economically speaking, at least.

Mr. DINGELL. Mr. Chairman, with all respect to Mr. Noel, I think he has done a good job and I am pleased he is back here at the table so we can carry on this meaningful dialog, but I am troubled by a point raised a little earlier. During and after the embargo we found that there were much larger private holdings of oil which tended to grow im-

mediately following the embargo in apprehension, perhaps, of future adverse circumstances in the market. Am I correct?

Mr. NOEL. Yes, sir. But I am not sure the implication of it is correct.

Mr. DINGELL. Let me continue and we will probably find that there is an implication.

It is also a fact, as I recall, that each time that Arab pricing or OPEC oil pricing was a matter of discussion, that there have been significant increases in private holdings of oil throughout the economy. This has been done by most of the major oil companies, it has been done also by a lot of the major users' things like residual oil, and that sort of product, and commodity. Am I correct?

Mr. NOEL. Yes, sir.

Mr. DINGELL. It is also true that we have large amounts of product, petroleum and crude and residual, in what we have roughly called the pipeline. That is the point between the time it comes out of the ground and hits the port of entry and the time it gets to the burner tip or the point of use by the consumer. Am I correct?

Mr. NOEL. Yes, we are including that.

Mr. DINGELL. I get the impression from your testimony that you made at FEA this morning—and I am not referring to you personally—a more or less conscious judgment that that will not be included in the strategic reserve plan. Is that a correct impression?

Mr. NOEL. There are a number of factors involved there. One of them is the economies of scale derived from doing it as a single centralized program, as opposed to having each refiner and each importer maintain separate stocks which ultimately would impact on the consumer in that those costs would be passed through. It was our general conclusion it was far better in terms of the costs to the economy to do it on a centralized basis, to derive those economies of scale—all kinds of economies of scale. This appeared a better way to proceed than having individual pieces of the industry maintaining, higher stock levels than they presently maintain.

Mr. DINGELL. Let us address that if we may, please. Is it not fair to say while you are waiting around to get the strategic reserve in being that essentially all you have is the pipeline?

Mr. NOEL. That is correct.

Mr. DINGELL. If that pipeline happens to be low and you are faced with an embargo you are going to be——

Mr. NOEL. That is exactly the point Mr. O'Leary was making previously about continuing to monitor inventory levels and insuring that we maintain a minimum level, simply for that reason.

Mr. DINGELL. I am talking about moving this inventory level within reasonable bounds to assure that it gives us some additional capacity to withstand adverse impacts of some kind of oil embargo or some adverse energy action by some other country. Am I correct or incorrect in this?

Mr. NOEL. You make an excellent point, Mr. Chairman.

Mr. DINGELL. Having made that excellent point, let us direct ourselves to the problem at hand and what are we doing to get this kind of situation in place prior to the day that we have our larger storage undertaking in place? I gather nothing.

Mr. NOEL. That is not correct, Mr. Chairman.

Mr. DINGELL. Then the next question is, what are we doing?

Mr. NOEL. What we are doing is this. The present reporting system available to us, not that we don't have authorities as you have pointed out on a number of occasions, that we have adequate tools to require the industry to report the status of their supplies. We presently have available to us data on only primary stocks. That is to say, at the refinery. We know what products exist there. We know what crude exists there. We do not know what happens at the secondary and tertiary levels beyond that. That is to say, we do not have good records.

We do not have good data as to what is available at the wholesale level. We do not have good data as to what is available at the user level. What we are doing about that is my office is presently evaluating what we have and what we don't have together with Mr. Christie's folks to determine what additional information is needed to get to the point that you are talking about.

Mr. DINGELL. I applaud this but your real hope in increasing your inventory levels lies not on what is on retailer's shelves but what is in the tank farm, in the pipelines, or in devices of this sort, does it not?

Mr. NOEL. I don't think I agree with that, Mr. Chairman. I think that during an interruption such as a freeze on a river or a severe interruption ranging all the way from a distribution problem to a very severe supply problem, one of the greatest benefits that can be derived is to have at the point of use adequate stocks. That is to say, if a homeowner has 500 gallons—

Mr. DINGELL. I do not quarrel with this. I fully agree with you and it would certainly have been immensely valuable to use during this recent freeze.

Mr. NOEL. Yes, sir.

Mr. DINGELL. The problem I have is, just considering relative volumes, inventories are relatively insignificant in relation to the amount that you would have in the other kinds of holdings. Isn't that right?

Mr. NOEL. I don't think that is right. I have forgotten the figures now and perhaps you have also, it was calculated 2½ years ago when we were in the middle of the embargo, how much fuel would be in gas tanks if all gas tanks were kept 100 percent full or nearly so.

Mr. DINGELL. It is difficult for a man to keep a gas tank full when he has a teenage son or daughter.

Mr. NOEL. Yes. There is one other point I did want to make before we get too far from it. You are right, during the embargo there was a very significant change in stockage level immediately after the embargo began. I think it is also important to recognize that stocks were at an all-time low immediately prior to the embargo.

There were a variety of reasons for that, some of them very important national policy questions. As you know, there were significant changes in the import policy by the Nixon administration at that time. That led to a very, very low stock level at the time the embargo began. If you are measuring what happened during the embargo against that base, that was well below the base line.

Mr. DINGELL. I get the distinct impression, and I do with some regret, that you have not fairly devoted your attention to the need of considering inventories in the hands of different kinds of users and producers and refiners and so forth and that we are going to have to

ask you good folks down at FEA to give some more careful consideration to this. I don't want you to take these comments critically, but because we are working together to develop this policy, I just feel if I don't make that point I am not helping you.

Mr. NOEL. I think you are exactly right, Mr. Chairman. We know a lot about what is available at the refinery and importer level, adequate and very complete data is available. I have looked at those forms. I will be happy to provide them to you. We know that. What we do not know is downstream from there at the wholesaler and beyond.

The point was made in earlier testimony that there is some concern on our part as to whether or not utility companies for sure and other critical industries are maintaining prudent levels of stockage levels. That must be examined.

Mr. DINGELL. It lies within your power to get the answer to that.

Mr. NOEL. Absolutely.

Mr. DINGELL. If you need any power we want to know about it. As a matter of fact if you need authorities in this area I am specifically requesting you at this time to advise us so that we know that you have everything you need to get that information.

Mr. NOEL. Yes, sir. Our legal staff is examining that. If it appears we do need additional authority—quite frankly initial indications are that we have adequate authority—we do not have the reporting system itself.

Mr. DINGELL. I would ask you to advise us on that point and would ask unanimous consent that the record remain open for including that at this point.

Mr. NOEL. Very well, sir.

[The following information was received for the record:]

Existing legal authorities, included in the FEA Act, ESECA, and EPCA, appear to be sufficient to allow FEA to collect additional inventory data, as needed. Section 5-2 of the Energy Conservation and Production Act, Public Law 94-385, requires that the Director, Office of Energy Information and Analysis establish a National Energy Information System. This system is to contain such energy information as is required to define and permit analysis of the institutional structure of the energy supply system including patterns of ownership and control of mineral fuel and distribution, and marketing of mineral fuels and electricity. Inventories are part of the distribution systems for fuels and as such are included in GAO inventory data associated with refineries (FEA-P320-M-O), Pipelines (FEA-P322-M-O), and Bulk Terminals (FEA-P321-M-O).

Mr. DINGELL. I will ask you now to find time to review the suggestion of Mr. Canfield and GAO with regard to their comment that they made earlier and the document which is entitled "Issues needing attention in developing the strategic petroleum reserve." You have given a response to that but I would ask that you very specifically give us a rather detailed response going more into the points that are raised.

I want to very clearly bring to your attention I tend to think you are not using your inventory control powers with sufficient vigor and concern and since I note that we are trying to arrive at the maximum early storage response I would like to have your further thoughts in the light of our discussion today.

Mr. NOEL. Yes, sir.

Mr. DINGELL. Mr. Moffett.

Mr. MOFFETT. Thank you, Mr. Chairman.

On the second page of the report, page i, the GAO has said that they have not determined the extent to which these stockpiles can be used to serve the objective. If you would direct yourself specifically to that in carrying out what the chairman was discussing I think that would be helpful.

Mr. NOEL. I will be glad to.

Mr. MOFFETT. At this time I have only one further question and then I will ask counsel to direct some questions to the GAO panel. I believe this question would best go to Mr. Noel as long as you are here. How do you see the hoarding prohibition under section 459 as coming to bear on this plan?

The chairman asked the question about hoarding a few moments ago. Are you familiar with that section?

Mr. NOEL. I am generally familiar. We are aware that a number of people, one of whom is Mr. Alfred, for example, who will testify later today, have expressed concern about the experience we gained during the last embargo which indicated that things were happening during the embargo that don't normally happen. It is our view, based on, again, our legal determination, that we have adequate authorities, once the oil is U.S.-owned oil, to require certain things to happen. It is less clear to as what controls we have over oil in transit.

We are examining that question and again if I might I would suggest that if it turns out we don't feel we have adequate authority to prevent the sort of hoarding that certainly was the intention of the legislation, we will of course bring that to your attention for appropriate legislative remedy.

May I ask at the moment—I did not get the reference—you mentioned a small "i."

Mr. MOFFETT. On the second page of the GAO report. In the third paragraph, it says, "GAO has not determined the extent to which these stockpiles can be used to save the objectives."

Mr. NOEL. Thank you, very much.

Mr. MOFFETT [presiding]. The chair recognizes counsel, Mr. Demarest.

Mr. DEMAREST. Mr. Canfield, earlier I inquired of Mr. Noel regarding the 120-day stockpile figure which had been transmitted by the United States to the International Energy Agency. He indicated only approximately 15 percent of that figure was available. If I understand your testimony correctly, you have not questioned the 15 percent in terms of saying it is not 15 percent, it is more or less, but your concern is that we don't have the data which would permit us to make a judgment on whether 15 percent is accurate. Is that correct?

Mr. CANFIELD. That is correct, Mr. Demarest.

Mr. DEMAREST. It is also your suggestion that FEA should obtain that data, is that correct?

Mr. CANFIELD. That is correct.

Mr. DEMAREST. Mr. Noel, who in the U. S. Government submitted the 120-day oil stockpile figure to the IEA?

Mr. NOEL. I don't know the answer.

Mr. DEMAREST. Would you supply that for the record?

Mr. NOEL. I will be happy to.

[The following information was received for the record:]

The State Department actually transmits data to the IEA; however, the data are first collected and compiled by the Interior Department's Bureau of Mines, then provided to the Federal Energy Administration where they are converted to IEA units and format, and then sent in final form to the State Department. It should be noted that these data do not show days of supply, but provide the IEA with the basis for making that calculation. It is done essentially by converting all stocks reported to crude equivalents, deducting 10 percent as an estimate of stocks which are unavailable, and dividing the remainder by average daily net imports for the preceding calendar year. While this is the agreed methodology for calculating IEA figures, it is generally acknowledged that useable days of supply calculated on this basis are highly overstated.

Mr. DEMAREST. I also would like you if possible to submit for the record a breakdown of that 120-day stock figure by the category of components, crude oil, measure of refined petroleum product, in refinery tanks, what volume led to inclusion in the 120-day figure in both terminals, how much of that oil went into the 120-day figure, pipeline tankage, barges, intercoastal tankers, et cetera, each category if you would, so that we will know what are the component parts of that 120-day storage. Is that possible?

Mr. NOEL. I am not at all sure it is possible but it will certainly serve as a useful opportunity to find out exactly what is available. Once we know that we will both know.

Mr. DEMAREST. I think it must be possible if somebody came up with a 120-day figure, if you got the aggregate did you not look at the components?

Mr. NOEL. I think you can derive those figures in other ways. First of all you know what you have imported over a period of time, you know what your production has been over a period of time, you know what your consumption has been. I suspect you can come to a reasonable conclusion as to what is in the system simply by subtraction. I am sure it is more sophisticated than that. I think you can get at least some measure in that way.

Mr. DEMAREST. Depending on the period of time if you started with the conception of the oil industry, we would have leaked this amount. I don't know what your starting point is. I would request for the record that the aggregate 120-day figure broken down by its components.

Mr. NOEL. Yes. We will do that. If we have difficulty doing it that will tell us an answer to the earlier question.

[The following material was received for the record:]

The inventory data that is used for reporting to the IEA is Bureau of Mines data which is broken down into components as shown in the table below:

COMPARATIVE ANALYSIS OF SELECTED PETROLEUM STATISTICS FOR THE OIL EMBARGO PERIOD AND THE MOST RECENT COMPARABLE PERIOD

[Primary inventories, thousand's of barrels]

Selected product stocks/year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Mogas:							
1973-74	214,610	207,418	209,478	221,327	219,105	220,347	223,805
1975-76	221,532	232,139	234,978	240,510	248,901	239,097	224,008
Refinery:							
1973-74	(86,383)	(80,603)	(79,533)	(85,596)	(90,593)	(89,754)	(93,630)
1975-76	(85,262)	(89,376)	(93,211)	(96,699)	(99,587)	(94,646)	(84,905)
Bulk terminal:							
1973-74	(81,176)	(80,865)	(84,895)	(86,704)	(80,709)	(82,007)	(80,539)
1975-76	(89,718)	(94,203)	(93,369)	(98,617)	(102,092)	(96,672)	(91,390)
Pipeline and working tanks:							
1973-74	(46,966)	(45,875)	(44,967)	(45,163)	(47,756)	(48,546)	(49,583)
1975-76	(46,513)	(48,512)	(48,345)	(45,148)	(47,175)	(47,731)	(47,670)
Plant:							
1973-74	(85)	(75)	(83)	(79)	(47)	(40)	(53)
1975-76	(39)	(48)	(53)	(46)	(47)	(45)	(43)
Distillate:							
1973-74	203,000	200,218	196,461	181,217	149,162	128,852	125,587
1975-76	226,160	235,798	108,833	165,477	150,472	138,340	137,285
Refinery:							
1973-74	(67,156)	(69,243)	(67,605)	(59,846)	(47,658)	(42,301)	(44,856)
1975-76	(61,981)	(68,137)	(59,539)	(46,284)	(43,646)	(43,840)	(44,884)
Bulk terminal:							
1973-74	(101,991)	(97,909)	(96,402)	(88,482)	(74,307)	(62,405)	(58,268)
1975-76	(132,119)	(135,622)	(116,541)	(89,150)	(80,833)	(72,750)	(70,826)
Pipeline and working tanks:							
1973-74	(33,818)	(33,030)	(32,414)	(32,851)	(27,160)	(24,116)	(22,429)
1975-76	(32,013)	(31,990)	(32,707)	(29,994)	(25,960)	(21,716)	(21,539)
Plant:							
1973-74	(35)	(36)	(40)	(38)	(37)	(30)	(23)
1975-76	(47)	(49)	(46)	(49)	(33)	(34)	(36)
Residual:							
1973-74	54,964	51,985	53,480	46,548	45,004	47,222	51,339
1975-76	81,858	83,131	74,126	66,592	68,359	65,132	66,458
Refinery:							
1973-74	(28,314)	(28,901)	(27,348)	(25,405)	(23,899)	(25,170)	(26,979)
1975-76	(33,753)	(35,861)	(33,706)	(30,906)	(31,290)	(29,774)	(28,835)
Bulk terminal:							
1973-74	(26,650)	(23,084)	(26,132)	(21,143)	(21,105)	(22,052)	(24,360)
1975-76	(48,105)	(47,270)	(40,420)	(35,686)	(37,569)	(35,358)	(37,623)
All products:							
1973-74	680,880	661,585	658,840	636,130	603,221	593,257	608,274
1975-76	773,101	793,082	747,867	665,592	679,363	658,487	649,937
Crude oil:							
1973-74	246,297	249,998	242,478	233,035	240,723	244,665	256,385
1975-76	269,584	270,950	271,354	289,296	277,414	283,112	286,628

Mr. DEMAREST. If you will also provide for the committee an valuation of what happened to each of those component categories of storage during the embargo. It would provide us with a benchmark as to the patterns of inventory drawdown or buildup in an embargo situation and whether there is really available 120 days of stockpile. Would that be possible?

Mr. NOEL. Yes, sir.

[The following information was received for the record:]

The preceding table shows what happened with each component during the last embargo (1973-74). For comparison it shows similar data for the same months of 1975-76. It is interesting to note that the changes in inventory levels in 1973-74 were very similar to 1975-76. Motor gasoline inventories increased during the period in both cases, while distillate and residual inventories were reduced to meet winter demands. (These trends are normal seasonal fluctuations in inventories.) Crude oil inventories remained relatively constant in both cases.

It is not clear that any definitive conclusions can be drawn from this data regarding the extent to which industry inventories could be drawn down during an interruption. It is clear, however, that industry did not make any major changes in its normal inventory practices during the last embargo. Without further study, we believe it would not be appropriate to assume that inventories could be reduced substantially without causing serious economic impacts due to disruptions in the production and distribution system.

Mr. CANFIELD. The only information we have on that was furnished by an official in FEA, and I will talk to Mr. Noel about who, that that information was supplied by FEA, not particularly by his office, to the State Department, who in turn supplied it to the IEA. We will help them to the best of our ability to track it down. That is where we got our information, from an FEA official.

Mr. DEMAREST. Would it be appropriate to compare the experience, Mr. Canfield, of these oil stockpiles during the embargo of 1973-74 so as to evaluate the true availability of these 120-day stockpiles in the event of a further embargo?

Mr. CANFIELD. If we had the data on the present situation we probably could go back and do a comparative analysis between the two. Until we get the data on the present situation, there would not be anything to compare. Once we have that kind of data, give us a chance to look at it and we can give you a feel for how hard the job will be and how long it will take us to do it.

Mr. DEMAREST. Is that data likely to be available, Mr. Noel?

Mr. NOEL. I really don't know if it is available. Obviously it is something in which we have a significant interest as well.

Mr. DEMAREST. Thank you very much.

Mr. DINGELL. From reading the report of GAO I find a number of questions that have been raised with regard to royalty oil supply and the use of it. They make the bald statement here at page 10 "FEA in its plan stated the supply of royalty oil is not sufficient for the 500 million barrels of strategic petroleum reserve and even if this approach were adopted, other oil would have to be purchased. We agree with FEA on this position.

"However, in our view there is a substantial supply of royalty oil available and to the extent that royalty oil is acquired, significant cost savings to the Federal Government would result as discussed below," and then they go into a discussion. They also indicate there is a goodly amount of this which is not under contract available to small refiners. Their comments indicate that the oil could be shifted from small refiners under the entitlements bias and that sort of thing and that pricing bias that exists, without adverse effect on the small refiners.

I won't ask you to give us a comment on that at this particular time but I would ask both FEA and GAO sit together and give us some response with regard to this particular matter. A similar comment is found in regard to transportation costs for royalty oil, acquisition of Elk Hills oil. I would ask Mr. Noel and Mr. Canfield if they would sit

together and discuss this matter with regard to those particular points since they are matters of concern to the subcommittee in view of our overall concern.

Lastly, GAO has given us a rather extensive comment in the fourth chapter with regard to the finances. There appear again to be some modest differences between the two agencies in regard to the fashion in which they believe the matter should be financed. It would be again the request that if you please, gentlemen, you sit together and give us the benefit of your collective wisdom with regard to the points raised there since that is a matter of some concern to this subcommittee.

Mr. CANFIELD. Mr. Chairman, I think I can speak for both of us. We will be happy to do that and come back to you as soon as possible with any resolved problems and any residual problems.

Mr. DINGELL. I want you both to understand that these comments do not indicate any lack of respect for either of you gentlemen. I know you are trying your best and are doing a good job. The Chair will yield to counsel at this time.

Mr. DEMAREST. Mr. Canfield, in chapter 4 you do suggest that the Federal Energy Administration may be relying too heavily upon general tax revenues for financing the reserve. I think there has been some comment at this hearing by members that perhaps they are not relying heavily enough on tax revenues since they may be using the entitlements program to in effect, subsidize the reserve.

However, the General Accounting Office appears to be suggesting that a user-fee system would be perhaps administratively feasible and equitable. Is that your recommendation, that we look to spreading this burden more directly over oil consumers than the taxpayers?

Mr. CANFIELD. We understood the argument on the entitlements and we did not address it head-on. The other option would be to buy it at world market prices. We understood FEA in effect would be moving into the entitlements ballgame itself in order to get at the average national composite price. That is a small amount. I did not want to confuse that issue with the issue of whether or not the direct beneficiaries of this reserve should bear the cost of the reserve through some sort of excise tax as opposed to taking out of the general fund of the Treasury for use in that sense.

This is a very explicit sort of program. It has explicit dollar costs. It is an explicit business-type activity. It benefits explicit people. It seemed to us that going back to the old 1950 Appropriation Act edict that users pay users fees, it would be quite possible for the Government to consider the option that the beneficiaries pay for the product. We just offered two possible suggestions and we did not look at all the financing options.

The people benefitting from it are the people going to use the product. We suggested the possibility of putting an excise tax or a tariff on so that the explicit amount could be paid for. Now we tried to avoid the Catch-22 you get into, of setting up a sinking fund where you have a special fund set aside to finance this reserve. We said make sure there is a sufficient excise tax to fund the reserve, put it in the general fund of the Treasury and then it becomes subject to the appropriation process.

But in point of fact you have an amount of revenue equal to the amount of outlay and the net budgetary effect does not increase the deficit and the people who use the reserve have to pay for it. That is the only point we were trying to make. I don't believe FEA is either agreeing or disagreeing with us at this time.

Mr. NOEL. Perhaps I should mention to you, Mr. Chairman, that as a result of a continuing dialog with Mr. Canfield and his staff, this was one of the recommendations that had been made informally, that alternative pricing mechanisms be considered. You will note in the SPR plan which you have not seen yet since it is only being submitted today apparently, there is a reference in there to the fact that we intend to consider alternative pricing mechanisms.

For your information we are considering an import-fee system, an excise tax on product system, and/or a combination thereof, simply because we don't think we know enough about it. As a result of suggestions made by Mr. Canfield and others, when the new administration came in this was raised to their attention as an issue that had been raised by a significant number of folks and they asked us to continue, and that is one reason it does appear in the SPR plan as it does.

Mr. DINGELL. I commend you for those comments. I would ask whether you need new authority for import fees, rather for the imposition of import fees or for utilization of the entitlement program to generate additional funds for this kind of undertaking, referring specifically to statutory authority. Could you give us a comment?

Mr. NOEL. Yes, sir, with respect to the entitlement, it is our belief that the administrative authorities do exist which would permit us using the entitlement system as proposed in the proposed rulemaking.

Mr. DINGELL. I observe that there was a previous entitlement system which existed in the petroleum industry whereas a person bought an entitlement to bring in imported oil. I am also curious about where the authority existed for this but this was apparently a flat import fee. I am curious as well about whether that authority still exists or whether you need additional statutory authority to exercise that sort of power in connection with the matter.

Mr. NOEL. I am not competent to comment on it.

Mr. DINGELL. Would you inquire and let us have some?

Mr. NOEL. Yes, sir, as I recall that was a subject of some interest a year or so ago.

[The following information was received for the record:]

Under Section 232 of the Trade Expansion Act of 1962, the President has authority to impose import fees if necessary to protect the national security. It is questionable, however, that this authority could be used solely for the purpose of raising revenues to pay for the Strategic Petroleum Reserve.

Mr. DINGELL. Could you also advise us as to what would be the cost to the consumers of some regulations which would increase through appropriate regulatory power of the FEA the holdings in the pipeline or in the inventories of crude and product and which portions you could most benefit the public interest by lowering this?

Mr. NOEL. We will be happy to do that. We cannot do it at this time. I suggested to you we were examining that question.

Mr. DINGELL. I want you to inquire with reasonable care to get us an answer of considered character at the appropriate time.

Mr. NOEL. Yes, sir.

Mr. DINGELL. The Chair recognizes Mr. Demarest again.

Mr. DEMAREST. Mr. Canfield, I would like to follow up on the question I asked regarding financing of the reserve. Would it be fair to say that the underlying premise of your suggestion that alternative financing mechanisms, including those which rely on user fees, the underlying premise is that there are ascertainable classes of people who benefit directly from the reserve?

Mr. CANFIELD. Yes, it is stated explicitly on page 15, it is stated as a premise, "It is both efficient and equitable to pay for public services through user fees when a user of a service can be identified and the collection system is administratively feasible."

Mr. DEMAREST. One of the problems I have perhaps with the suggestion, and I would like to throw it out for your comment, is that perhaps because of the nature of the strategic reserve the beneficiaries are not specifically ascertainable. For example, does the person who heats a motel with electricity generated by coal and who owns no car of his own benefit from strategic reserve which lets motorists drive on the highways and frequent his establishment? Does the person who commutes to work on an electric-powered train and works in a factory fueled by oil, but he is not directly a consumer of it, benefit by the employment that is generated by that consumption?

Who are the beneficiaries? I think you could make an argument, could you not, that the beneficiary, really is the economy as a whole by permitting higher levels of employment, reducing unemployment, reducing the welfare burden of unemployment and increasing general commercial trade when there is an embargo or severe supply interruption.

Mr. CANFIELD. I think that is right. If you did that then I think you would probably shy away from, for example, a gasoline tax unless you had some desire to have a tax on gasoline because you thought it might have a conservation sort of implication. But you would not necessarily then, if you made that argument, shy away from any sort of tariff or tax on product per se if you believe that it will distribute itself fairly widely through the economy.

The second premise is, that it is based on, clearly an identifiable program. The country has been in a quandary as to how it is going to finance itself out of a rather major deficit. We have a situation here in which we were trying to convince the American public that we actually have a problem. An identifiable tax on imported crude which people say is less reliable—and we have been trying to make that point without a great deal of success, than crude we have produced domestically—would have a direct visible impact on the American consumer. It is going to cost the consumer, it has a higher economic cost, because you have to protect yourself by having a stockpile.

I don't want to argue for any particular kind of excise tax. What I want to argue for here is an identifiable program which could be self-financing which would not add to the net budget deficit. All we are arguing is that this ought to be considered as opposed to going into the Treasury every year up to \$7 or \$8 billion total, more than that actually because that is just the beginning. The cost of the reserve has been estimated to cost upwards of \$20 billion before we are through if we go the whole gambit—here is a possible situation in which you can identify a particular need based on a particular set of circum-

stances and have revenues coming in which are designed to offset the budget deficit that you are talking about.

We just ask that that be considered, not that it be the panacea but that if be considered and all the problems and consequences of that be considered.

Mr. DEMAREST. In making that recommendation—

Mr. CANFIELD. Excuse me, sir, it is not a recommendation.

Mr. DEMAREST. In suggesting that these alternatives be explored, have you given consideration to the effect of the entitlement program on diminishing the impact to the consumer of any tax you levy on imported oil? You have talked about a market signal being communicated to consumers' incremental supplies, but because of the structure of the entitlements program in reality any kind of import fee tends to be dissipated across the entire economy and there is no direct disincentive to the consumer of that oil.

Would we have to make some exception from the entitlement program to make this effective?

Mr. CANFIELD. Mrs. Perholtz will answer that.

Mrs. PERHOLTZ. Through the entitlements program any tax or tariff would be spread to all those refiners who would acquire product under that program. Yes, it would be equally spread to all consumers and refiners even though it was imposed—if it were a tariff, for example—on imported oil.

Mr. DEMAREST. Could I request for the record that if the Federal Energy Administration does an evaluation of these alternatives that they provide to the committee an analysis of the impact of the entitlements program upon the selected alternative financing mechanisms?

Mr. DINGELL. The Chair would hope that you would do that. I am not sure we will put it in the record but I would like to have that, Mr. Noel.

Mr. DUFFUS. Mr. Demarest, on page 16 we show the implication and the effect of the entitlements program on the 60 cents suggested tariff. It would be equalized and I think it would result in about 34 cents per barrel for crude oil. That is how we arrived at the eight-tenths of a cent per gallon cost increase for petroleum products.

Mr. DINGELL. In fairness to Mr. Noel, if you have any difficulties or problems with these figures it would be helpful to us if you would let us know. We will keep the record open for that purpose. Without objection, it is so ordered.

Mr. NOEL. May I say, Mr. Chairman, Mr. Canfield reminds me if I had any problems with the figures I should have said so some weeks ago.

Mr. DINGELL. They are your figures?

Mr. NOEL. No, sir, they are not. But we have adequate opportunity to comment on their figures.

Mr. DINGELL. In fairness if you do have a difference of opinion we would like to have your thoughts because it helps the committee.

Mr. NOEL. Absolutely.

Mr. DINGELL. Mr. Noel, if we buy this oil now and put it in the ground and OPEC keeps raising prices, and domestic prices keep going up, we have ourselves a pretty fair investment do we not?

Mr. NOEL. We do. We also have, and the reason it is important that we have it in place before the—let us say there was a situation similar to the last one where prices quadrupled very soon after the embargo

began, you are in a position, the President of this country is in a position to put whatever price he wants to on the oil. As I understand the program, it is to serve as a buffer, to minimize the traumatic economic impact that we experienced so recently. Essentially as I suggested earlier, I think it is important that the President have the opportunity to adjust the price of oil coming out of the program.

Mr. DINGELL. I am not sure that this kind of thinking is to be found in the Office of Management and Budget, but I feel that it is very important.

Mr. NOEL. I might say we are looking at that. As Mr. O'Leary alluded to it previously, we are looking at alternatives to the present system, essentially acceleration, for example. It is possible to come up with a situation where you could do the entire program on an accelerated basis at equal or slightly less cost simply because of what we expect will happen to the cost of oil.

In other words, by buying oil earlier before it has become inflated conceivably you could save enough money to do the other things you need to do and do it more quickly. The new administration has asked for some data on that and it has been provided. The decision whether or not that will be done is still in the executive branch.

Mr. DINGELL. How about bartering surplus farm commodities? Has the Department of Agriculture or OMB ever considered that?

Mr. NOEL. I have no personal knowledge of that. I know and I believe you are aware, Mr. Zarb examined some barter arrangements at one time. I am not sure whether that included farm products. I have no personal knowledge of that.

Mr. DINGELL. Could you inquire into that and let us know?

Mr. NOEL. Yes, sir. I believe Mr. O'Leary intimated this morning that he has discussed this with others in the new administration. I am not privy to those at this point.

Mr. CANFIELD. On your same point, Mr. Chairman, I would add one thing. We did not have the time to address it in this part of our monitoring effort, but I think it is crucial. The point you raised which is at what price one should have the reserve, do you sell the product, because to the extent that the Government goes to its traditional idea that "we bought it at cost so we will sell it at cost," there is a lot of incentive for every time an emergency comes up to say why don't we go to the reserve and get it out of there because it is the cheapest thing around town. That kind of issue has to be addressed very carefully. Mr. Noel says they will do it. We will continue to monitor that kind of problem.

If it becomes the cheapest oil around in a few years that will be the first place that the people put the pressure on to get it out of there. It is just that simple. I don't think the country can afford it in the long run because then if you thought the reserve costs are up in 1973 or 1974 for whatever reason you ought to see what they are going to go up in 1978 and 1979. I think that making some sort of explicit judgment that the price of the oil coming out of the reserve will bear relationship to the price that you otherwise will have to pay for oil if it did not come out of the reserves is crucial.

We have not done any analysis there. But it's a question of great criticality.

Mr. DINGELL. Would you make that analysis available to us?

Mr. CANFIELD. I say we have not done it. As we continue out monitoring that will be a major question we will look at.

Mr. DINGELL. I think that would be very helpful to us. Mr. Noel.

Mr. NOEL. Our general presumption, Mr. Chairman, is that the base price for the oil when it came out of the reserve would be something on the order of what the price was on the day before the interruption, and that would be the minimum it ought to be because if we use the reserve at any time I think it will reinforce the value of the reserve and therefore we would plan to reconstitute it. It would seem to me an awful unfortunate situation is we were to sell—let us say the oil has gone up \$5—at the acquisition cost and then we have to replace it at the new inflated cost. We again end up paying for a strategic storage program.

It rather seems more likely to me or more feasible to me that as the barrel came out of the ground it would be something on the order of what the price was at that time even though the world price might even go up simultaneously. As you are certainly aware this military problem is a very difficult one, but at least the reserve would offer that kind of buffering effect to the President of this country and the Congress and to how they would mitigate the impact of the embargo.

Mr. DINGELL. I am not arguing with your comment, but let me ask you this question. On this point have you considered and at least tentatively rejected the idea of exercising some kind of FEA authority as found in EPCA to assure that refiners and others increase their stocks of petroleum and petroleum products as part of our national policy of protection against some kind of externally induced impact in our supply? Would you please in kindness to me review that judgment and make some indications to this committee as to costs and benefits from that kind of action?

Mr. NOEL. Of an inventory control program?

Mr. DINGELL. Yes. We will soon face a problem of 2 million barrels a day of Alaskan oil coming along, the Elk Hills supply and people in California not allowing it be landed and nobody quite knowing what to do with that. Has that been considered as a part of your judgment as regards the strategic oil reserve?

Mr. NOEL. Yes, sir. In terms of the oil we put in storage I think we recognize that essentially what we put in storage is an incremental barrel as I mentioned previously. On the other hand it does not matter to me what the source of the oil was if it meets the requirements of the program. In other words, we have aggregated what the requirement of refineries will be during an embargo given the scenarios that we have discussed.

Mr. DINGELL. I don't want to criticize you for that judgment, but it does strike me that one should know where the oil is coming from, what its price is, and where it is going when one is setting up the strategic petroleum reserve. I feel this ought to be a consideration and ought to go into the judgment that is to be made in connection with it, because we are going to have this temporary local surplus on the west coast and trying to decide where we are going to put that oil.

Mr. NOEL. If I might touch briefly on the Elk Hills situation?

Mr. DINGELL. And the Alaska situation.

Mr. NOEL. Yes, sir, but Elk Hills is one we know something about. There are several problems with the Elk Hills position from our point of view. The upper zone is not suitable for storage. It could be exchanged. The lower zone would be usable for a portion of the

reserve. On the other hand, I have talked to Captain Dowd who manages the Elk Hills project.

He has acknowledged to me that they do have logistical problems of moving that oil out and getting it into the system. But the bottom line I am looking at is what will be the net cost to the SPR program of a barrel of oil out of Elk Hills. The GAO folks suggest that is going to be a bargain because it will not get a high price, because of Alaskan oil or others, and it will be sold at a price which would not be a revenue producer for the Government and that we would sell it at a lower price then we are having to pay for other oil to fill the reserve. Obviously, if that were to happen, we would be interested in buying it. Our assumption is the opposite. We believe as a result of the renegotiation of the Elk Hills contract that the oil will sell for a price which, when the transportation costs are added on and it is moved to a salt dome in the gulf coast area, will end up costing us more than the national composite average. We disagree.

Mr. DINGELL. I don't take a position on this, I just hope it will be considered.

Mr. NOEL. My point is that essentially we have not ruled out any kind of oil. If it meets our requirement under the bid processes and under the procurement process, it does not matter to me whether it comes in as an imported barrel or it comes from domestic supplies. If we use the equalization process, the entitlements system as we propose, it comes out to the same net cost to me and the same net cost to other users and other participants in the entitlement system. We have absolutely no bias against Elk Hills or any other type of oil that might be available.

The basic criteria are what is the landed cost or the installed cost going to be in the gulf coast area and does it meet the gravity and sulfur criteria that we have established.

Mr. DINGELL. I do not quarrel with your logic. Mr. Canfield, do people from the GAO have any comment you wish to add?

Mr. CANFIELD. Not at this time.

Mr. DINGELL. You have been very generous with all your time. We thank you for your assistance to the committee.

[The following letter was received for the record:]

FEDERAL ENERGY ADMINISTRATION,
OFFICE OF THE ADMINISTRATOR,
Washington, D.C., February 24, 1977.

Hon. JOHN DINGELL,
House of Representatives,
Washington, D.C.

DEAR MR. DINGELL: I am writing to advise you of the status of the proposed rulemaking regarding use of the entitlements program in connection with crude oil acquisitions for the Strategic Petroleum Reserve.

When I testified before your Subcommittee on February 16, 1977, you expressed your concern about using the entitlements system as part of our acquisition proposal. I responded that a thorough analysis would be undertaken and that a public hearing on the use of entitlements was scheduled for February 23. This hearing was cancelled today because no witnesses requested to provide oral testimony. A number of organizations have indicated, however, that they will provide written testimony. Accordingly, we have extended the deadline for filing written comments on the proposal from February 25 to March 9, 1977. This will permit us to consider public advice and views on this issue.

In addition, since conforming amendments to the Federal Energy Administration's price regulations would also be required as part of the entitlements proposal, a public hearing will be scheduled on those changes. This will provide an-

other opportunity for the public and for industry to testify on all aspects of the proposed entitlement rulemaking.

If you have further questions please do not hesitate to contact me.

Sincerely,

JOHN F. O'LEARY,
Administrator.

Mr. DINGELL. Our next witness is Mr. Soccolich, assistant to the director, Energy Policy Office, Commonwealth of Massachusetts. We understand you will be presenting a brief statement to the subcommittee. So you may consider yourself recognized at this time.

**STATEMENT OF HON. THOMAS P. O'NEILL, LIEUTENANT GOVERNOR,
COMMONWEALTH OF MASSACHUSETTS, PRESENTED BY GENE
SOCCOLICH, ASSISTANT TO THE DIRECTOR, MASSACHUSETTS
ENERGY POLICY OFFICE**

Mr. SOCCOLICH. Good morning ladies and gentlemen. I am Gene Soccolich, here speaking for Thomas P. O'Neill Lieutenant Governor of the Commonwealth of Massachusetts. I will comment today on the strategic petroleum storage draft report prepared by the Federal Energy Administration.

The strategic petroleum storage report, mandated by Congress, outlines FEA's plans for petroleum reserves for the Nation, should another oil embargo take place.

We in New England have a vital stake in FEA's strategic petroleum reserve plan. Eighty percent of our energy needs are served by petroleum. Sixty-four percent of our aggregate utility electrical operation is fueled by petroleum—a figure roughly four times greater than the national average. Residual oil—a staggering 90 percent of which is imported—powers much of this generation.

Our concern stems not only from our vivid memories of the last oil embargo and the hardships of that winter. We must consider that demand for residual oil may soar as industries across the Nation convert from natural gas to petroleum because of this winter's experience.

Congress requires petroleum reserves "readily accessible" to area importing more than 20 percent of their petroleum. New England is obviously involved by definition, and other regions may become so involved in the future.

We must make sure our plans are flexible in intention and assumption when faced with the potential threat of another oil embargo.

It is possible, though unlikely, that the next oil embargo may be Venezuelan, Nigerian, or Iranian—not Arab—in source. We cannot predict the future entirely from past experiences.

Given this perspective, I will review some of our more serious and overriding problems with FEA's plan:

This plan would establish a 500-million barrel crude storage capacity in the Gulf States. There would be no regionally-located storage reserve. Only crude oil would be stored. This oil, in the event of an embargo, would be transferred from salt domes to barges, from barges to tankers, from tankers to refineries, from refineries back to tankers, and then to the east coast. The FEA plan gives no explanation of the logic behind conducting such a massive transportation effort.

Heated tankers and barges must be used to transport residual oil. "Clean" vessels are used to move gasoline and No. 1, 2, and 3 oil. "Dirty" vessels are used for residual oil.

This leads to the problem of tanker capacity and availability. These questions only touch the surface of the transportation problem. Other questions need to be answered: How many U.S. flag tankers are available? What will happen should OPEC succeed in its attempt to buy and control a vast share of tankers; will this plan require a waiver of the Jones Act to allow foreign tankers to provide domestic transport (and what are the economic implications of such waivers); what provisions are made to handle weather emergencies such as current ones we face, when inland rivers vital to transportation freeze; and what guarantee do we have that pipeline capacity additions from the gulf to east coast will be made?

These obvious and immediate questions are not the only ones we have—what about refining issues and assumptions? Most domestic refineries are geared to producing a great deal of gasoline and very little residual oil. What guarantee do we have that in emergencies these refineries will voluntarily change their production patterns? FEA mentions gasoline rationing—but then does not specify a corresponding mandatory residual production program. If U.S. refineries cannot produce enough residual oil, we will be forced to turn to Caribbean refineries. Will they adjust their product slates to provide enough residual oil supplies? We do not control these refineries. We cannot compel foreign refineries to do our bidding. Europe, hit by the same embargo pressures might be able to pay Caribbean refineries higher prices than we, because of their greater demand.

The FEA plan assumes a new refinery will go up in Pittston, Maine, or in the Caribbean. We have no guarantee that this will happen. Nor can we assure ourselves that this new refinery would serve our region's needs.

I will pose one last question—not about transportation or refining—but about demand projections. FEA assumes a 1.3-percent rise in residual oil demand in New England. I sincerely hope we can cut our spiralling energy growth by that much. But FEA's region 1 projects a 15 percent increase in residual consumption for that same time period.

Which FEA projection is accurate? Does this plan provide for sufficient residual supplies in the case of an emergency?

These are questions of serious import for a region so dependent on imported oil. Still, I would not urge the FEA to scrap the entire plan. I urge Congress to authorize FEA to proceed with the crude oil program. But in doing so, I ask that you repeat the mandate of 18 months ago to assess the strengths of a residual oil storage program in the northeast.

This evaluation must be done in 10 months, and then submitted to this committee and to Congress for approval. It must include a detailed and complete analysis of the allocation and distribution system needed to deliver residual oil to New England and the Northeast.

It must include a detailed and specific regional residual oil strategic storage system located in our region. I do not demand that FEA recommend such a system—I ask FEA to put forth a specific plan—a plan which can then be weighed against the alternative of not establishing such a system.

Vital information and data are not included in the present FEA plan—meaning we cannot make a responsible decision on this issue.

I hope this evaluation will be an open and participatory process. The document you have before you now was prepared in a cloak of secrecy.

FEA has done only half its job. I urge Congress to approve the half which is complete, and to repeat its mandate for immediate action to complete the remaining half.

MR. DINGELL. Mr. Socolich, the committee thanks you for your very helpful testimony. I should advise that we share your concerns with regard to the availability to New England. I believe you heard my comment earlier.

MR. SOCCOLICH. Yes, I did, Mr. Chairman.

MR. DINGELL. I would like to indicate to you that the subcommittee will be monitoring the conduct of this program with considerable care to assure that the program works well in the interest of all parts of the country. Last of all, I note as I read your comment here that at page 3 you indicate that you have reservations about the program but that you do generally support it.

MR. SOCCOLICH. Yes, sir.

MR. DINGELL. Mr. Socolich, you have come a long way to satisfy the committee and we thank you for your kindness to us.

MR. SOCCOLICH. Thank you, Mr. Chairman.

MR. DINGELL. The committee will stand in recess until 2 o'clock.

[Whereupon, at 1:05 p.m., the subcommittee recessed, to reconvene at 2 p.m. the same day.]

AFTER RECESS

[The subcommittee reconvened at 2:21 p.m., Hon. John D. Dingell, chairman, presiding.]

MR. DINGELL. The subcommittee will come to order.

Our next witnesses will appear as a panel.

Zeb Alford, chairman, Energy Committee of New England Council; Mr. Donald B. Craft, New England Fuel Institute; and we were to have had the pleasure of having Mr. John Buckley, the Independent Fuel Terminal Operators Association, before us. Unfortunately his mother passed away, so he is unable to be with us.

Mr. Alford and Mr. Craft, if you will come forward.

Gentlemen, we are pleased to welcome you to the committee.

If you will identify yourselves for purposes of the record, we will be more than glad to hear your statements.

STATEMENTS OF ZEB D. ALFORD, CHAIRMAN, ENERGY COMMITTEE, NEW ENGLAND COUNCIL, AND DONALD B. CRAFT, EXECUTIVE COMMITTEE, NEW ENGLAND FUEL INSTITUTE

MR. ALFORD. My name is Zeb Alford, and I am appearing on behalf of the New England Council, a group of business, professional, and government representatives from throughout the New England region. I am chairman of the energy committee of the council.

We are here today to testify before this committee to demonstrate the concern which our region as a heavy consumer of residual fuel oil feels in response to the Federal Energy Administration's strategic petroleum reserve plan. I will speak mostly about New England and rely mainly on the figures of that region, because it is with those figures that I am most familiar.

However, I wish to emphasize at the outset that the deficiencies in this plan in failing to create a regional reserve for the unique product residual fuel oil, will in the event of supply disruptions be felt more broadly throughout import-dependent regions along the east coast and will affect consumers, schools, manufacturers, utilities, officer, and apartment buildings as well.

Mr. John Lichtblau of the Petroleum Industry Research Foundation has done an analysis of the FEA plan which demonstrates the need for such a reserve to protect all PAD I. For the convenience of the committee, I have attached a copy of Mr. Lichtblau's analysis to my prepared statement, and I ask that it be made part of the record.

Our concern arises because we are all too familiar with what happened during the last "interruption" in oil supplies. We believe that although the FEA plan offers some protection from these market "jolts," it does not remedy the major short-term, initial effects of an embargo: The market dislocations that cause expected shipments to be delayed and the short-term price to rise to unprecedented levels.

We believe that Congress recognized these problems, and mandated a solution of them. In the Energy and Conservation Act, Public Law 94-163, which created authority for the SPR Plan, Congress specifically required that there should be a "Regional Reserve" for each FEA District which during the preceding 24 months imported 20 percent or more of its demand of residual fuel oil. The FEA Administrator was instructed to include such a reserve as part of the SPR, "in or readily accessible to" each qualifying FEA region. The instructions of Congress on this point we think have been disregarded.

New England, together with large portions of the east coast down to Florida, depends heavily on residual fuel oil to generate electricity, to heat apartments, schools and office buildings, and to use as a boiler fuel for manufacturing operations.

In so doing, Petroleum Administration for Defense (PAD) District I depends more heavily than others on foreign sources of supply because domestic refiners only produce one-half of the U.S. demand for this product. FEA's plan concludes that in 1974-75, 58 percent of the residual fuel oil needs of New England were imported.

As high as that figure is, it actually understates the problem by almost half. The New England Federal Regional Council Energy Task Force, under the leadership of the New England FEA office, has shown that over 70 percent of the residual fuel oil consumed in New England is imported.

Thus for example, in 1975 New England utilities used 67 million barrels of residual fuel oil, and other users burned an additional 58 MMB; of that 126 MMB, over 72 percent was imported. In other years, imports have approached 77 percent. In my own company's case, in 1976, over 77 percent of our residual fuel came from foreign sources, even though 85 percent of the residual fuel we purchased was under contract. Attachment number one documents the countries of origin, and they are literally all over the world. Attachment number two documents the countries of origin for our contracts and spot purchases.

This use pattern is compounded by the fact that the storage system throughout New England is not designed as a long-term reserve. Because of variations in ship schedules and burn rates, it is rarely

more than half full, and often less than that. Its function is not to prevent shortages, but to smooth or dampen the usual "pulses" that occur in the normal delivery of residual fuel oil.

Mr. Chairman, earlier in the day there was quite a discussion about the 120-day reserve in the United States. I think that is an absolute mirage. There is no 120-day reserve in the United States and certainly there is no such reserve anywhere on the east coast that I have been able to discover.

I doubt that New England could last much longer than 12 or 14 days on average, assuming that its storage was reasonably full when an interruption occurred. This situation is not aberrational. The second largest utility in PAD I, Florida Power & Light Co., reports its storage varies between 14 and 24 days, at its maximum rate of burn.

Given this pattern, it is clear that even a short-term break in the flow of residual fuel could significantly disrupt New England's economy. The FEA has projected that it will take some 7 weeks for the crude oil stored in its SPR to be delivered as refined product to users on the east coast. Based on our experiences in the last embargo, we are very concerned about what will occur during those 7 weeks. We know that existing storage is not the answer. The FEA plan tells us to prepare to depend on continued imports which are in transit, and on diversions from other areas of the United States, while Caribbean refineries continue to ship to us.

During the last embargo, cargoes which were in transit at the time of the embargo were not delivered on time, at the usual port. FEA has documented that tankers were slowed or allowed to circle off the coast as the owners of those cargoes waited to determine how far the price would rise. We have no reason to believe that the same thing will not occur during the 7 weeks it will take for the crude oil from the SPR to move into operations.

In that period of time, New England could run out of residual fuel or be subjected to severe price gouging, unless it were willing to pay the high price which will certainly be demanded. The new international oil agreement upon which FEA apparently relies would not solve this problem and will indeed exacerbate it, because the United States will be a net exporter to its European allies.

Similarly we cannot simply depend on Caribbean refineries: They will react as would any other seller in the market, holding deliveries until the price is highest. Although FEA assures us that diplomatic and economic pressures can be applied to Caribbean refiners since the United States will be able to supply those refineries with crude oil under the FEA plan, such pressures take time to become effective and offer no certain guarantees. In testimony presented to FEA on January 27 of this year concerning the residual fuel oil entitlements program, Mr. William Edwards, executive vice president of Tauber Oil Co., stated:

Whereas the Middle Eastern supplying countries have imposed a much-maligned 5 to 10 percent price increase this year, Venezuela has imposed a 25 to 30 percent increase in the price of residual fuel since the government takeover of the petroleum industry in that country. Therefore, it appears that a reexamination may be needed of the long-held attitude that Venezuela should be regarded as a dependable, non-self-serving trustee of a portion of U.S. supply.

Quite to the contrary, the recent actions of the Venezuela oil industry managers almost seem to push the appraisal toward the category of "most opportunistic."

We at New England Power sought assistance during the last embargo from the FEA, the State Department, and the Canadian Energy Board in attempts to receive shipments of residual fuel from Canada which were due under our contract with the Golden Eagle refineries located in Montreal, Canada. We received no shipments and we received no assistance. And yet this is what FEA is proposing that we look forward to in the next emergency.

We also cannot depend on the quick transfer of resources from other areas of the United States. New England and all of PAD I is supplied residual fuel oil by water; there are no pipeline connections. In order for supplies to be transferred FEA would have to be assured of tankers or barges at reasonable prices, and of the location of any surplus residual fuel oil available for transfer to the "needy." During the last embargo, the prices of barges and tankers on time charters went up, despite the fact that many tankers were idled, since owners of bottoms realized that those seeking short-term charters needed the capacity quickly, and would be willing to pay.

Mr. Lichtblau's analysis, which I mentioned earlier, raises several of these same points concerning all of PAD I. Briefly put, we simply cannot be assured that the product made from crude oil shipped to the Caribbean refiners will either all come back to us, or otherwise not affect the amounts they would otherwise be shipping to us. And there are no assurances in the plan that the product which those refiners sell to us will be sold at the controlled price set by FEA.

Domestic refiners cannot be counted on as a source of fuel oil simply because they produce only half of the U.S. demand—and little of that product reaches the east coast market. During this record cold winter, ironically enough, electricity generated in New England from oil-fired equipment has been wheeled to as far away as the Midwest, because their coal piles have been frozen. If any interruption were to occur during another such winter, not only the Northeast but even the Midwest could be at the mercy of whatever price owners of oil would be charging to receive necessary supplies.

Based on these considerations, I believe an additional regional reserve of residual oil sufficient to meet perhaps six to eight weeks' demand would provide the best protection at the lowest cost against the problems of interrupted supply and high prices. Given a regional supply of residual fuel oil we could last through the initial period of dislocation until the SPR crude oil has been refined and made available, and the diplomatic and economic pressures had been given an opportunity to work.

Mr. Chairman, I have given you my views based on my own experiences—we purchase about 18 million barrels of residual fuel each year in my company. Our Nation squeaked through the last embargo—we should plan to do better next time. The Energy Resource Development Task Force of the New England Federal Regional Council reached the same conclusion in a report published last October.

In that report, after canvassing the problem, the Federal Regional Council concluded that present storage capacity in New England could not be used to carry the region through an interruption; and that only a regional reserve could provide the protection required by New England which is so heavily dependent on foreign sources for its residual fuel needs.

After investigating types and possible storage sites, the Regional Council concluded that large rock cavern storage could be created for approximately \$4.50 per barrel, less than half the cost of steel tankage in New England. The chairman of that council is Mr. Robert Mitchell, the Regional Administrator of the FEA.

But even if this figure is mistaken, as FEA has urged, there are other alternatives. For example, the Wabanax Energy Corp., Ltd., of New Canaan, Conn., has proposed a "Deepwater Bell Island Transshipment Storage Facility" to be located in abandoned mines in Conception Bay, Newfoundland, Canada, at costs well underneath those of rock cavern storage. At the very least, FEA has an obligation to reconsider its conclusions in light of these additional facts.

Moreover, despite some pressure from the Washington office of FEA to bring the Federal Regional Council into line with FEA's plan, the Regional Council has continued to point out the flaws in the national plan. Tom Noel, FEA's Assistant Administrator for the SPR, wrote the Regional Council urging reconsideration on the grounds that the New England Federal Regional Council had not considered the availability of transportation from other areas and the amount of oil in transit.

The New England Federal Regional Council replied by noting the shortage of tankers in the United States fitted for shipping residual oil and noted that New England's heavy dependence on imports had been ignored by FEA. I have copies of that correspondence which I would be delighted to place in the record of these hearings, if the committee would desire.

Based on my own understanding as a fuel buyer for a large New England utility of the way in which the petroleum market operates, I am forced to conclude that the FEA SPR plan fails to protect all of PAD I, that is, the entire east coast of the United States including Florida, from severe dislocations in the residual fuel oil market in the event of another interruption.

All of PAD I is dependent on foreign sources for the product, yet the FEA's reserve is 7 weeks away from fulfilling those needs and the plan has added many new links to an already complex supply chain.

We believe that in passing the Energy and Conservation Act, Congress mandated regional reserves to prevent exactly the problems which are now facing us in this plan: Congress required FEA to submit the plan, with full drawdown schedules and regulations, and to include a regional reserve to protect the heavily dependent regions of our Nation from economic coercion. FEA has simply failed to meet those obligations.

FEA, instead of realizing that the reserve program is an insurance policy for the American economy, and accordingly planning to take care of the worst emergency that might reasonably be anticipated, has instead based its proposed plan on optimistic assumptions that current and past events are already proving wrong. FEA's plan assumes total imports for 1985 will be only 7.5 million barrels per day, yet FEA reported on this month that imports for January 1977 were running 8.7 million barrels per day and domestic demand for all petroleum products for the 4 weeks of January 1977 averaged 20.4 million barrels per day.

Incidentally, this is the highest demand the Nation has seen. This demand was this month, and FEA is projecting the demand would not be that high in 1985.

FEA's plan further assumed that all nuclear power plants under construction and planned last year would be completed by 1985, yet construction on two large nuclear plants in New Hampshire was recently halted by an EPA order. A Maine electric power company announced that it was cancelling construction on one large nuclear plant this month because of construction permit problems.

A Virginia utility has just canceled two planned nuclear power plants, and a Missouri utility just announced cancellation of one nuclear power plant. These decisions strongly indicate that there will be a greater reliance, not less, on oil imports in the coming decade.

FEA, in its SPR plan, projected a scenario where foreign governments and refiners readily agree to continue regular deliveries of residual oil to us, at established contract prices, instead of performing as they did in the 1973 oil embargo. The result is that FEA has insured that American refiners will have a 90 day crude oil supply, while leaving consumers on the east coast, who are uniquely dependent on imported residual fuel oil, to "freeze in the dark" if the plan fails to work as projected. Simple equity and good planning require that any strategic petroleum reserve plan include a regional storage of residual fuel oil or be deemed less than the legislatively mandated protection.

Thank you, Mr. Chairman.

Mr. DINGELL. Thank you very much.

The Chair notes you have indicated that you wish a number of insertions and the attachments to your comments to be included in the record.

Without objection, those will appear at the appropriate place in the record.

[The documents referred to follow:]

STATEMENT OF JOHN H. LICHTBLAU, EXECUTIVE DIRECTOR, PETROLEUM
INDUSTRY RESEARCH FOUNDATION, INC.

I appreciate the Committee's invitation to testify on the subject of strategic petroleum reserves. I was privileged to testify before this Committee on the same subject nearly four years ago, about seven months before the Arab oil embargo and the OPEC price revolution. It is gratifying that the concept of strategic government oil storage, first proposed to and by the Committee at that time, has finally become law, essentially in the form originally proposed. On the other hand, it is regrettable that four years after these hearings we still have no strategic oil reserve at all and will not even reach the first stage in developing one for nearly two more years.

In my testimony today, I would like to address myself primarily to the Federal Energy Administration's (FEA) recently published Strategic Petroleum Reserve Plan. I would like to begin by commending the FEA for the quality of this report. It is well written, well researched and well argued. Most of my differences with the report are differences of opinion and judgment rather than fact.

NEED FOR AN ACCELERATED STORAGE PROGRAM

My first difference, however, is not with the report but with an aspect of the legislation on which it is based. I believe development of a strategic oil reserve should be given a higher priority and held to a shorter time schedule than is the case under the present law, for we might quite literally need it any day. This is not meant to sound alarmist. But with current and near-term oil imports ac-

counting for over 40% of our demand (a higher share than projected in the FEA report for 1980 and 1985), we need maximum attainable protection against import interruption at the earliest achievable date.

The possibility of substantial and sustained import interruptions go far beyond the conventional scenario of another Arab oil embargo resulting from another Arab-Israeli war. For instance, the civil war in Nigeria from 1967 to 1969 caused a virtual cessation of the country's crude oil exports, not by design but by blocking access to most of the producing fields. If a similar situation were to occur in either of the two OPEC super producers—Saudi Arabia and Iran—at recent production levels, a world-wide crude oil shortage could develop in 60–90 days under some circumstances.

Another consideration is that nearly 45% of our crude oil imports are of low-sulfur quality and are mostly used in refineries which require such crude. If production from any of the three major low-sulfur crude exporters—Nigeria, Libya and Indonesia—became interrupted on a sustained basis, U.S. refinery output might have to be seriously curtailed.

Thus, the possibilities of import interruptions are really quite varied. They can occur at any time and for reasons outside the control of the exporting country's government. This is why I believe we must adopt somewhat of a crash program approach rather than a business-as-usual one in developing our strategic petroleum reserves.

In this connection I would like to point out that while the FEA is planning to meet the Early Storage target of 150 million barrels by the end of 1978, as required under the law, it expects to have actual available storage facilities of 240 million barrels by then, according to the Report. It seems to me if the storage is there, it ought to be fully utilized, if possible. I do not believe the law prohibits such an accelerated storage program.

If the first 240 million barrels of storage can be put in place in 1977 and 1978, additional facilities of about the same magnitude can perhaps be developed in the following two years. If this is possible, the FEA's ultimate target of a 500 million barrels strategic petroleum reserve could be attained at the end of 1980, two years ahead of the legislative deadline.

AVAILABILITY OF CRUDE

Availability of crude is unlikely to be an obstacle to the achievement of such an accelerated target. Over the 3½ year period from mid-1977 to the end of 1980, storage shipments would have to rise from an initial level of 250,000–300,000 b/d to nearly 450,000 b/d in the last year. World demand for OPEC oil is expected to be relatively flat from late 1977 through the end of 1980 because of the large volume of non-OPEC production—primarily from the North Slope of Alaska, the North Sea and Mexico—which will come on stream during this period. Thus, the required volumes should be readily obtainable without a significant effect on prevailing price levels. Through 1978, it might also be possible to satisfy part of the storage requirements from Alaskan crude which will probably be in temporary surplus on the West Coast until a pipeline to the interior is built.

STORAGE SITES

However, other obstacles may prove more difficult to overcome in accelerating the storage build-up. They would be mainly in the area of environmental constraints, construction time, and availability of equipment. To reduce these obstacles would require the construction of very few, very large storage facilities rather than a larger number of smaller ones. The FEA is currently looking at 32 salt dome and mine storage candidates. Four or five of these could accommodate the entire required volume plus any desired later expansion.

CONSTRUCTION OF SUPERPORTS

Another time saving factor, which would also reduce costs, is maximum utilization of existing dock and oil delivery facilities. Of major importance in this connection would be the earliest possible start of construction of the LOOP and Seadock ports for supertankers at the Gulf Coast so that they may be ready to receive deliveries by 1980. Crude oil imports into the Gulf Coast have risen from virtually nothing in 1972 to 2 million b/d by the end of 1976. By 1980 they could approach 5 million b/d. This will greatly strain existing dock facilities and could well create a bottleneck in bringing in strategic storage imports, in the absence of

superports. The ports would also greatly reduce the time required to refill the strategic storage following withdrawals during a sustained interruption. Finally, the proposed ports would of course reduce the delivered cost of the stored oil because of lower transportation cost.

INCREASING THE STORAGE CEILING

I do not think the 500 million barrels is an adequate ultimate level of protection from import interruptions. Neither does the FEA. However, the Report considers the level adequate for any likely type of import interruption in 1982, based on an assumed import level of 7.5 million b/d in both 1980 and 1985. For both years this is at least 1 million b/d below the projection of most oil companies as well as some government agencies. However, the FEA has increased its import projection for 1985 in every year since it first published one in 1974. It can be expected to continue these upward adjustments.

In trying to set an adequate storage level Congress used the highest consecutive three month level of crude oil imports in 1974-75 (5.4 million b/d) as a base. The problem with this formula is its historic rigidity. This year crude imports will be at least one million b/d above the base level. By the early 1980's they will probably be 1.5 million b/d higher. Thus, on a current basis the three month import formula requires at least 650 million barrels of storage by 1982. Consequently, the program should not be stopped when the 500 million barrels target has been reached but should be continued for another couple of years at an annual rate of about 100 million barrels. This would not require any change in the law or other action at this time. But the FEA may want to consider it in selecting its storage facilities.

A Strategic Reserve of Residual Fuel Oil

I agree with the FEA's overall findings that no strategic storage of refined products is required but I disagree with its findings that this also applies to residual fuel oil consumed in PAD I (East Coa

Last year PAD I imported over one million b/d of residual fuel oil (exclusive of shipments from the Virgin Islands) or 66% of its total requirements for this product. No other U.S. region has a remotely comparable foreign dependency for any of its oil products.

We expect the level of these imports into PAD I to be about the same in 1980. The FEA, by contrast, projects nationwide residual fuel oil imports of only 700,000 b/d for 1980. If our figures are right the need for a residual fuel oil storage program is stronger than the FEA has assumed.

But apart from the question of volume, I am uneasy about several aspects of the FEA's plan to assure adequate residual fuel supplies during an import interruption. The FEA proposes to ship crude oil from its strategic storage to non-U.S. refineries in the Caribbean for processing and reshipment to the U.S. There are two potential problems with this plan which are not addressed in the Report. (1) The FEA does not explain what assurance there is that all the products made from the strategic-reserve crude shipped to the Caribbean will actually come back to the U.S., and that these re-imports will not affect the volume of other shipments from these refineries to the U.S. (2) There is no comment in the Report of how to enforce U.S. price controls on these imports, i.e. prevent them from being sold back at world prices which are likely to be substantially higher than U.S. prices during an import interruption.

In evaluating these eventualities, it should be kept in mind that not only the oil companies but also their Caribbean host governments may become involved in these matters, depending on the type of interruption and the reason for it.

Because of these uncertainties I think a modest reserve of residual fuel oil as an integral part of the government's overall strategic petroleum storage program would be desirable to provide minimum protection for the East Coast against import interruptions. For example, a stock level of 15 million barrels of residual oil would protect against a one-third import interruption for 45 days. This would at least be enough to permit time for the rearranging of supply sources and, thus, avoid the necessity of having to buy at the soaring spot prices which usually accompany the beginning of supply interruptions. To the extent to which it may be desirable to put this reserve into tanks the preferable location would of course be the principal importing region of his product.

ENTITLEMENTS

The FEA proposes to use the existing crude oil entitlements program to reduce the cost of oil from world market levels to the average price paid by U.S. refiners for controlled and uncontrolled domestic and foreign oil. As the Report points out, this would reduce the cost burden of the strategic reserve on the federal budget. While this is obviously desirable from the fiscal view point, I question the use of entitlements for this purpose on other grounds: (1) The creation of a strategic petroleum reserve is clearly a national security measure and should be treated as such. It should therefore be funded just as any other national security measure, namely out of general revenue which means the cost would be borne by all tax payers. (2) The use of entitlements understates the real cost of the storage program to the nation by transferring part of it to oil consumers. (3) The stated purpose of the entitlements program is to equate crude oil cost among refiners. It should therefore not be used for an entirely extraneous purpose. (4) The proposed use of entitlements to lower the cost of oil for strategic storage would give the Federal Government a direct vested interest, to the tune of several hundred million dollars annually, in the continuation of the entitlements program beyond its stipulated expiration date. This could influence government policy on the subject of crude oil price controls beyond April 1979.

This concludes my prepared statement. I would be glad to try to answer any questions you may have.

ATTACHMENT 1 TO STATEMENT OF ZEB D. ALFORD, NEW ENGLAND REGIONAL COUNCIL
NEES RESID FUEL OIL PURCHASES, 1976, BY COUNTRY OF ORIGIN

Source	Barrels	Total (percent)
New York Harbor.....	1,078,354.03	6.0
Ghana.....	128,633.57	.7
France.....	575,673.22	3.0
U.S. gulf.....	1,405,704.20	7.0
Romania.....	738,880.54	4.0
Venezuela.....	6,442,325.01	34.0
Italy.....	1,913,830.31	10.0
Puerto Rico.....	1,950,063.41	10.0
Angola.....	175,070.86	1.0
Rotterdam/Antwerp.....	899,384.24	5.0
United Kingdom.....	1,123,809.63	6.0
Aruba.....	1,041,479.39	6.0
Trinidad.....	93,408.64	.3
Boston.....	73,120.67	.3
Greece.....	290,293.00	2.0
Curacao.....	602,346.98	3.0
Bahamas.....	218,640.89	1.0
Gabon.....	119,641.07	.7
Total.....	18,870,656.96	100.0

Attachment No. 2—NEES Residual Fuel Oil Purchases—1976

(Contracts and spots—Country of origin)

Asiatic petroleum:		Northeast petroleum:	
Venezuela.....	26	Venezuela.....	62
New York Harbor.....	12	United Kingdom.....	20
Rotterdam.....	11	Belgium.....	10
U.S. gulf.....	11	Puerto Rico.....	8
Curacao.....	10	Maraven, South America: Venez-	
United Kingdom.....	8	uela.....	100
France.....	6	Montedison Sp.A.: Italy.....	100
Greece.....	5	Spots:	
Bahamas.....	3	U.S. gulf.....	26
Trinidad.....	3	Italy.....	16
Italy.....	3	N.Y. Harbor.....	12
Romania.....	1	Romania.....	15
Puerto Rico.....	1	United Kingdom.....	7
Exxon Co., USA:		Venezuela.....	6
Venezuela.....	65	Angola.....	6
Aruba.....	35	Gabon.....	5
Petroleum marketing:		Trinidad.....	4
Puerto Rico.....	61	Boston Harbor.....	3
Venezuela.....	17		
Romania.....	8		
U.S. gulf.....	8		

FEDERAL REGIONAL COUNCIL
OF NEW ENGLAND,
Boston, Mass., January 21, 1977.

MEMORANDUM TO RECIPIENTS OF THE COUNCIL'S "EMERGENCY PETROLEUM STORAGE IN NEW ENGLAND" REPORT

In November 1976 you received a copy of the Federal Regional Council (FRC) report entitled, "Emergency Petroleum Storage in New England." The report was a joint effort of the participating agencies and departments of the FRC Energy Resource Development Task Force. It addressed petroleum storage considerations which represent reasonable requirements for New England. It was intended as a reference base for analyses and evaluation of alternative strategies for minimizing adverse regional impacts of petroleum supply disruptions.

On December 16, 1976, Thomas E. Noel, FEA's Assistant Administrator for Strategic Petroleum Reserve, wrote and invited participation by the Council in developing the Strategic Petroleum Reserve allocation plan. Mr. Noel's letter also discussed what he considered to be inconsistencies between the conclusions of the FRC report and the Strategic Petroleum Reserve plan that FEA recently submitted to Congress. Copies of Mr. Noel's December 16 letter and the Council's January 18 response are enclosed for your information.

Your comments and observations are invited.

GERALD P. REIDY,
Vice Chairman.

Enclosures (2).

FEDERAL ENERGY ADMINISTRATION,
Washington, D.C., December 16, 1976.

Mr. ROBERT W. MITCHELL,
Chairman, New England Federal Regional Council,
Boston, Mass.

DEAR BOB: We have reviewed the report entitled "Emergency Petroleum Storage in New England" which was prepared by the Energy Resource Development Task Force of the New England Federal Regional Council. We reviewed this report with special interest and concern in view of the fact that it appears to be inconsistent with the Federal Energy Administration's (FEA) Strategic Petroleum Reserve (SPR) Plan that was recently submitted to Congress, after review and approval by the Energy Resources Council. I am sure you are aware that, while the material addressed by the two reports share a common subject, the conclusions reached are quite different.

A number of specific comments on the report which I hope will be of some benefit to the Regional Council are included in the enclosure. I believe that there are several important omissions in the report which are the dominant factors in the differences between the conclusions of FEA's Plan to Congress and the Regional Council's report. For example, I can find no discussion in the Council's report of any analysis of transportation capacity which might lead to the conclusion that deliveries of oil could not be made to New England from storage sites and refineries located elsewhere. Thus, the case for storage of a reserve in New England itself does not appear supported by analysis. Also, there appears to be no analysis of the availability of domestic refinery capacity to justify the storage of refined products rather than crude oil. On these two points and others, FEA does not concur in the conclusions reached in the report.

FEA has examined the needs of New England, potential losses during an interruption, and forecast transportation and refining capacity in depth, and concluded that crude oil storage located outside the Region could satisfy New England's demand for products. All available evidence shows that it is substantially less costly to store the Reserve in large underground salt domes or mines in the Gulf Coast area rather than in new rock caverns in the New England area. FEA was obligated to recommend the lowest cost program that will effectively achieve the objectives of the Strategic Petroleum Reserve.

Although more a matter of tone than statement, the report seems to imply that regional storage in New England would be available for local use at the discretion of some (undefined) regional authority. I am sure you understand that use of the SPR authorized by the Energy Policy and Conservation Act, wherever located, will require Presidential authorization and will be distributed in accordance with approved National allocation regulations. In our judgment, the key to effective regional protection against petroleum interruptions will be effective and efficient allocation regulations; the SPR merely provides the raw materials.

We are now beginning an intensive effort to assure that a detailed allocation system is developed to achieve an equitable distribution of all available petroleum supplies, including domestic production, uninterrupted imports and reserve oil. It is unrealistic to expect that any region of the country will live only on reserve oil during a severe interruption, without any reliance on domestic production or uninterrupted imports.

We would be happy to have the New England Federal Regional Council participate in the development of these allocation plans. We believe this would be the most effective way of assuring that New England is protected in the event of a petroleum supply interruption.

Sincerely,

THOMAS E. NOEL,
Assistant Administrator,
Strategic Petroleum Reserve.

Enclosure.

DECEMBER 15, 1976.

FEA's COMMENTS ON A REPORT ON "EMERGENCY PETROLEUM STORAGE IN NEW ENGLAND" BY THE NEW ENGLAND FEDERAL REGIONAL COUNCIL, ENERGY RESOURCE DEVELOPMENT TASK FORCE

POSSIBLE PETROLEUM SUPPLY INTERRUPTIONS

The report includes no analysis of possible petroleum supply interruptions. It is entirely unclear what type of an interruption is anticipated.

The Federal national security agencies, along with the Federal Energy Administration, have studied a wide range of possible interruption scenarios and two of these were selected as being "most likely" for purposes of planning the Reserve.

In regard to the Council's report, it should be noted that the national security agencies do not believe it is credible to plan for a complete loss of foreign imports. Even a severe interruption is unlikely to result in a loss of more than about 50 percent of imports.

It also is important to note that the likely scenarios would result in the loss of only a small portion of imports of refined products. Most of New England's refined products come from refineries in the U.S. or in the Caribbean which are expected to be available to continue to supply New England's needs even during a severe interruption. These refineries will be able to meet New England's needs for residual oil, and all other types of oil, as long as crude oil is available to those refineries. The SPR, and an associated allocation system, will be able to assure that these refineries obtain a continuing supply of crude oil.

The conclusions of the Council's report give the impression that either no consideration was given to possible interruption scenarios, or it was based on the assumption of completely unrealistic interruption scenarios.

AVAILABLE REFINERY CAPACITY

The report does not seem to recognize that New England is part of a petroleum supply complex that receives the bulk of its refined products from refineries located in the Gulf Coast area, in the Caribbean and on the East Coast. As mentioned above, PEA has not identified any reason to assume that New England will be cut off from those refineries. The report provides no analysis to indicate any basis for such an assumption, even though it suggests that New England would receive "more adequate protection" if it planned for a loss of its total supply of petroleum products.

AVAILABLE TANKER CAPACITY

A factor in petroleum supply to New England is tanker availability. The Council's report makes no mention of any analysis of the adequacy or vulnerability of tankers during an interruption.

FEA's analysis shows that suitable tankers will be available in more than adequate quantity, and that there is no reason to be concerned about the vulnerability of tankers in the event of a petroleum supply interruption.

AVAILABILITY OF SUPPLY ON SHORT NOTICE

The Council's report concludes that it is necessary to have a reserve in New England so that it is available on "short notice". The report presents no analysis of the time available from the start of an interruption until New England would be affected. There is no recognition of refined product supplies in transit, industry inventories, or the fact that most refineries supplying New England would not be affected by an interruption for several weeks because of crude oil supplies in transit and in stock. There appears to be no analytical basis for the Council's conclusion that the reserve supplies must be available on "short notice".

The FEA's analysis of this question shows that there would be more than enough time to take crude oil from a Gulf Coast storage site, ship it to a refinery and on to New England, before consumers in that area felt any loss of refined products. An allocation system will be developed to assure that refined products as well as crude oil are equitably distributed in the event of an interruption.

COST OF STORAGE IN NEW ENGLAND

The Council's report suggests that rock cavern storage could be obtained for about \$4.50 per barrel. There appears to be no engineering basis for that estimate.

PEA's estimate of the cost of useful storage capacity in a rock cavern in New England is \$6.10 a barrel, based on the best studies available.

At \$6.10 a barrel, compared to \$2.25 a barrel for central salt dome or mine storage, an 80 MMB reserve in New England would cost \$308 million more than central storage of that amount.

FEA has not been able to identify any reason why this added expense should be incurred by the U.S. taxpayers.

FEDERAL REGIONAL COUNCIL
OF NEW ENGLAND,
Boston, Mass., January 18, 1977.

Mr. THOMAS B. NOEL,
Assistant Administrator, Strategic Petroleum Reserve, Federal Energy Administration,
Washington, D.C.

DEAR TOM: The Council appreciates your letter of December 16th and the invitation to participate in the development of the Strategic Petroleum Reserve allocation plans. The Council has asked Bob Mitchell, Council Chairman, and Joe Pecoraro, Coordinator of our Emergency Storage Task Group, to represent the Council in this effort.

Thank you for pointing out that the conclusions reached in the Federal Regional Council of New England (FRC) Energy Resource Development (ERD) Task Force report entitled *Emergency Petroleum Storage in New England* are not fully compatible with recommendations in FLA's Strategic Petroleum Reserve Plan recently submitted to Congress.

In reviewing your response, the Council requested and received the following pertinent information from the ERD Task Force relative to the regional storage issue:

1. "80% of New England's energy came from petroleum in 1975. The national average was 47%.
2. 58% of the region's electricity was generated from petroleum during 1975 . . . a petroleum dependency ration for electricity generation nearly four times higher than the national average,
3. Some 70% of the region's residual fuel oil is imported from non-domestic sources . . . making the region's economy and safety particularly vulnerable to petroleum import interruptions. During the 1973-74 embargo, aggregate utility residual inventories in the region dropped to dangerously low levels, and
4. The FRC ERD Task Force concludes that even under the most optimistic conservation and alternative energy projections the region's volumetric dependence on petroleum will increase through the year 2000, even though the ratio of oil in the total energy mix will decline."

In light of this information, it is the opinion of the FRC ERD Task Force that the following specific regional concerns are not adequately addressed by FEA's proposed Strategic Petroleum Reserve Plan:

1. Existing domestic refining capacity being unable to make sufficient residual to compensate for a major interruption in residual imports, and
2. Even if sufficient domestic refining capacity were to exist to make up for interrupted residual imports, there is the additional problem of suitable and adequate American tanker capacity to move the product to New England.

The ERD Task Force has concluded that perhaps the safest, most economic and most environmentally acceptable plan for New England might be development of regional rock cavern storage for #4 fuel oil. Obviously, any further exploration of this option would include careful analysis of economic, environmental and social as well as geological criteria in assessing potential sites. The ERD Task Force report listed representative sites with appropriate geological conditions, but did not attempt detailed evaluations.

The Task Force recognizes that such regional storage would be under national control during an emergency. Thus the Council and the ERD Task Force have a vital interest in the national Strategic Petroleum Reserve allocation program. The Council believes that the allocation program should be structured so that each region of the country will be treated equitably with respect to the functional capability of its economic infra-structure during an emergency. In other words those regions, like New England, that are disproportionately dependent upon residual fuel oil for electricity generation should have relatively higher allocations during an emergency to permit operation at the deemed national rate.

Attached, for your further consideration, are additional comments prepared by the ERD Task Force Strategic Storage work group to clarify any possible misunderstanding of certain study conclusions suggested by comments in your December 16th letter.

In closing, the Council welcomes and appreciates your interest in the unique problems of this region. The Council created the Energy Resource Development Task Force in the hope that it would work toward the resolution of problems associated with this region's energy supply; given the severity of the embargo's impact on this region during '73-'74, the Council believes that in cooperation with local, state, federal and private groups its Task Force has done much to offer alternatives to this region's present and future dependence on oil. Please let us know when you are ready to discuss allocation plan alternatives.

Sincerely,

GERALD P. REIDY,
Vice Chairman.

Hypothesized emergency situation.—The Council's task force study was based on a situation similar to the '73/'4 embargo. The task force recognizes that such an event—if allowed to extend beyond that embargo time frame—would create an extremely serious and difficult problem for this region. There is no doubt that the excessive reliance of New England on imported petroleum creates an abnormal problem in comparison to other less petroleum dependent parts of the country. It should be noted, that the study tended to concentrate on potential residual shortages. This was deliberate because of the crucial importance and high petroleum dependence of this region's electrical generating industry. Any restriction of residual imports would be immediately reflected in this segment of the area's economic base. The thrust of supply relief must be directed toward this industry. It really doesn't matter what type of shortage is involved. If residual supplies are restricted, the region is in trouble:

The memorandum of 12/15/76 that accompanied your letter, envisioned that a severe interruption would probably result in a 50% import loss. If this assessment is correct, then the FRC ERD Task Force conclusions take on added importance. A residual import loss of such magnitude dictates the need for local emergency inventory availability as stipulated in the enabling legislation. With some 70% of New England's residual supplies coming from foreign sources, a supply curtailment of 50% would quickly create a severe crisis in the region.

Refinery capacity.—The Council Task Force reviewed available refinery data and tried to define regional supply sources for residual fuels. Relatively small volumes come from continental United States refineries. Venezuela, the Caribbean and Europe, to a lesser degree, are the major regional supply sources. The Task Force feels that existing regional use and supply patterns, together with demand projections through the year 2000 under the various scenarios in the study fully support the conclusions set forth.

Available tanker capacity.—The FRC ERD Task Force study did not have at its disposal any definite tanker availability data. However, the residual requirements of New England and the question of tanker capacity suited for heavy fuel oil service must be addressed. It is well known that the availability of such American ships is quite limited.

Supply availability.—The Council LRD Task Force believes that the case for a New England-based residual inventory has been strengthened by the Salt Dome Draft EIS. Section 8.23.1—Barge Transport paragraph 2, reads as follows:

"A possible disadvantage to this method of transport occurs if one or more additional storage sites along the Gulf coast are also developed with the intention of using barges for oil transportation.

"Under these conditions, there may not be enough barges (or barge operators) available to handle the total volume of oil within the desired time frame (see section 4.5 for the case of Weeks Island and Cote Blanche developed together). This lack of barge capacity would be a serious flaw to the program under conditions of an oil supply interruption."

Cost of storage.—The Council ERD Task Force does not agree with your statement that no engineering basis was used for the projected cost of \$4.50/barrel for rock storage. The Council ERD study group consulted with one of the world's foremost experts in this technology, the Sweco Company. Further, the Council ERD Task Force is convinced that your projection of \$6.10/barrel for New England rock storage is excessive.

STATEMENT OF ARTHUR T. SOULE ON BEHALF OF THE INDEPENDENT FUEL TERMINAL OPERATORS ASSOCIATION, BEFORE THE FEDERAL ENERGY ADMINISTRATION, AUGUST 19, 1976

Thank you very much for the privilege of appearing before you today. My name is Arthur T. Soule. I am President of Patchogue Oil Terminal Corporation of Brooklyn, New York. Patchogue is an independent deepwater terminal operator serving dealers and consumers in the New York area and on Long Island.

I am appearing today on behalf of the Independent Fuel Terminal Operators Association (IFTOA) in response to the FEA Notice of Hearing and Request for Comment, "Revision of the Mandatory Oil Import Program," which appeared in the Federal Register on July 21, 1976, 41 F.R. 30058-62 (F.R. Doc. 76-21035). The Association is composed of 23 companies which operate deepwater terminals along the East and Gulf Coasts from Maine to Mississippi.¹ None is affiliated with a major oil company. Members market home heating oil (No. 2 fuel), diesel fuel, residual fuel oils (Nos. 4, 5, and 6 fuels) and gasoline at the wholesale and retail level.

Members of the Association operate 59 deepwater terminals and 48 barge terminals with a total storage capacity of over 60 million barrels. The geographic distribution of those facilities is as follows:

	Number of terminal operators	Number of terminals		Total storage capacity (barrels) ¹
		Deepwater	Barge	
New England.....	7	22	4	12,652,000
Middle Atlantic (New York-Maryland).....	11	23	32	33,482,000
South Atlantic and gulf coast.....	5	14	12	14,203,000
Totals.....	23	59	48	60,437,000

¹ The product breakdown is as follows: No. 2 fuel oil, 19,300,000 bbl; residual fuel oil, 29,500,000 bbl; other products, 11,700,000 bbl.

Most of our members have been in the terminal business for generations. Some companies began in the ice business, got into the coal business and then became fuel oil marketers as that energy source became dominant in our marketing areas. We operate, as you can see from the chart above, a number of large terminals which are capable of receiving ocean-going tankers. The typical terminal facility, as the Panel knows, consists of docks, unloading facilities, pipelines, storage tanks and "racks", the platform from which oil is pumped from the tanks into fuel oil trucks for transport to the consumer. Our terminals are located in or near the areas of consumption of fuel oil and are an integral part of the complex distribution system that carries bulk petroleum fuels from the refinery to the ultimate consumer.

We purchase from refiners—either in the United States or abroad—and bring the material by tanker to our facilities, where it is unloaded and stored in our large tanks. The oil is then pumped into barges or trucks owned by ourselves or other companies and transported to the ultimate consumer—the home, factory, apartment, school or hospital. As independent companies, we provide direct competition to the major oil companies and provide an alternative supply source for thousands of independent retail dealers and millions of consumers who would otherwise be forced to rely solely on the large companies. We handle about 25 percent of the No. 2 fuel oil and nearly 50 percent of the non-utility residual fuel oil shipped to the East Coast. In New England our members market 40 percent of the No. 2 fuel oil and nearly 60 percent of the non-utility residual fuel oil.²

The members of our Association have been deeply involved with and affected by the oil import policy of the Federal Government for more than 15 years. As importers we were, of course, adversely affected by the imposition of the mandatory quota in 1959. We fought for relaxation and the eventual removal of the quotas on residual fuel imports into the East Coast; that occurred in 1966. Our Association was formed in 1968 with the express purpose of achieving a similar

¹ A list of members and a more detailed description of the Association is attached. (Attachment A.)

² For a more detailed analysis of the independent position in the East Coast residual fuel oil market, see statement of the Independent Fuel Terminal Operators Association before the FEA hearing on "Exemption of Residual Fuel Oil", July 23, 1974.

relaxation in the quotas on No. 2 fuel oil; that process began in 1970, culminating in abandonment of the entire quota system in 1973.³

Because of our intense interest, we worked closely with Federal officials in developing the 1973 program, relating to both No. 2 and No. 6 oil. As the FEA is aware, some of the elements of that program were designed to deal with the specific competitive problems facing independent importers such as ourselves. Under Sections 213.15 (Allocations of residual fuel oil—District I) and 213.34 (Allocations of No. 2 fuel oil—District I) members of our Association receive fee-free licenses to import fuel oil into the East Coast; these licenses are gradually being phased down and will be terminated on April 30, 1980.

In light of our long involvement with and close working knowledge of U.S. oil import policies and programs, we wish to offer our comments on the revision being considered at today's hearing.

I. GENERAL COMMENTS

The Independent Fuel Terminal Operators Association is strongly opposed to the FEA proposal to remove license fees on imports of petroleum products. We urge that the current import program be maintained, as originally planned, until 1980.

The FEA proposal represents a sharp change in Federal policies—a shift that will result in a higher level if imports and increasing U.S. dependence on overseas refiners of petroleum products. At a time when our dependence on crude oil imports, particularly from the Middle East, is greater than ever, it is incomprehensible to us that the very Federal agency charged with the responsibility of reducing dependence is proposing to increase it. FEA's plan poses great risks to our future national security; it is clear that while dependence on any foreign imports is undesirable, dependence on product imports creates a greater risk than dependence on crude oil imports since the bulk of our imported product comes from a fewer number of countries. This aspect of the FEA plan has apparently been ignored.

Our concern is based on the conviction that once the product fees are removed they will never be reimposed. It is inconceivable that a future President will, as a matter of policy or politics, allow the \$1.05 fee to go into effect in 1979. As domestic product prices approach the world level with the end of crude oil price controls, no President will by his own action raise prices by an additional 2½ cents per gallon—a year before the election.⁴

In brief, it is clear to us—and will be clear to the industry, the nation and the world—that if the FEA plan is put into effect, it will mark the end of any barrier to the free flow of imports of foreign refined products into the United States. It will also mark the abandonment of FEA's professed—and Congressionally mandated—goals of increasing domestic storage and refining capacity and reducing our dependence on overseas sources of energy.

II. SPECIFIC COMMENTS

1. *FEA Rationale.*—Our Association should like to comment on the rationale and justification presented by the Federal Energy Administration in the Federal Register Notice of July 21.

First, it is claimed that the proposed revision will simplify the oil import regulations, reduce their complexity and do away with the "special deals" that were built into the 1973 plan. Frankly, the new FEA plan is as complex as the old, if not more so. While the draft regulation has not been published, the descriptive outline clearly indicates that there will be all sorts of new rules that apply in different ways to different parts of the country. And with no apparent justification, the FEA intends to continue some of the so-called "special deals".⁵

³ For additional background see comments submitted to the FEA by IFTOA, "Evaluation of the Mandatory Oil Import Program", September 17, 1975.

⁴ At that time the President will, in all likelihood, be under great pressure to remove the fee on crude oil imports as well, in order to prevent a similar additional rise in domestic crude oil prices. If the product fee is not restored, he will, as a matter of consistency and practical politics, have to remove the only remaining fee, that on crude oil.

⁵ The FEA proposes, for example, to maintain the long-term allocations for U.S. islands and territories, since they are "government obligations, intended principally to benefit the economies of Puerto Rico and the Virgin Islands". Aside from the fact that these allocations were made to and for the benefit of private companies (including major companies), it is hard to understand why the government has no similar obligations to independent marketers operating on the U.S. East Coast.

In actual fact, the present import regulations are far less complex than most other FEA regulations—particularly the entitlement regulations. In a sense, by blending the two regulations—oil import and entitlements—FEA is jumping from the frying pan into the fire. The import regulations have existed since 1959; they are understood and accepted by industry. They work well and efficiently, and there is little dispute and controversy about their application. It strikes us that of all the FEA rules, these are the most workable and least complex, and that the FEA rationale about simplicity is not supportable.

Second, FEA expresses great concern about the impact on consumers of petroleum products. As companies who depend on consumers for our business, we have long supported and worked for lower prices and assured supplies of fuel oil for the thousands of retail fuel oil dealers and millions of homeowners we serve. However, in actual fact the removal of import fees will have little or no immediate impact on consumer prices. Almost no No. 2 fuel oil is being imported, and virtually all the No. 6 fuel oil is being imported on a fee-free basis.⁶

The critical question is whether FEA is really serious about consumer prices. If it were, then it would be recommending two steps: (1) elimination of the 21 cent per barrel bias against foreign imports in the crude oil entitlements program⁷ (2) elimination of the 21 cent per barrel license fee on crude oil imports. Further, it would not be proposing imposition of the \$1.05 per barrel fee in 1979. These steps would have a far greater impact on consumer prices than the removal of current product fees, and the first two would be immediate and very visible.

Third, the FEA expresses concern about the impact of the current program on market entry. It apparently feels that because import licenses are allocated on an historical basis, new companies are prevented from entering the business. Although we know of no instances where petroleum companies were discouraged from entering the market because of the product import rules, we can identify a more serious barrier to market entry—the Federal Energy Administration. As the FEA may recall, when the 1973 program was announced, the President and the Chairman of the Oil Policy Committee (the Deputy Secretary of the Treasury) made specific reference to the role of the Oil Import Appeals Board in assuring that there would be no impediments to market entry, particularly by independent companies.⁸ Until the Spring of 1975, the Board did serve this function. It granted relief to independent companies which had built terminals and storage facilities, as well as new refining capacity. Unfortunately, when the FEA took full control of the Board in 1975, it virtually closed down its operations, thereby creating a serious barrier to market entry by independent importers.⁹

In brief, if FEA is really concerned about this problem, it could easily and effectively be dealt with. FEA could simply instruct the Appeals Board—as did the President and the Deputy Secretary of the Treasury in 1973—to adopt a more sensible and flexible operational policy.

Fourth, the FEA contends that there will be sufficient incentive in the new import system to achieve all the objectives of the present one. As companies directly affected, we strongly disagree.

The independent deepwater terminal operator plays a vital role in the distribution system of the petroleum industry.¹⁰ As controls on residual fuel were relaxed during the 1960's we made substantial investments in storage and distribution facilities, based on the assurances that quota-free allocations were to be given to importers and resellers of this product. As controls on No. 2 fuel oil were relaxed in the late 1960's and early 1970's, we expanded our facilities for handling this product, again based on the Federal policy of granting allocations directly to

⁶ See attached analysis of impact on consumer prices (Attachment B). As that analysis indicates, the removal of fees will have no impact on residual fuel prices on the East or West Coasts since import volumes are far less than the volume of fee-free licenses. The first impact on prices will not be felt for two years, sometime during the 1978-89 allocation period.

⁷ It might be noted that, in contrast to the position expressed in the July 21 Notice on import fees, the FEA, in a Federal Register Notice of July 29, 1976, 41 F.R. 31575 (F.R. Doc. 76-22006), announced hearings on September 8 to determine whether the 21 cent bias should be increased.

⁸ On April 18, 1973 the President stated: "We will make full use of the Oil Import Appeals Board to ensure that the needs of all elements of the petroleum industry are met, particularly those of independent operators who help to maintain market competition." On the same day, the Deputy Secretary of the Treasury stated: "The Oil Import Appeals Board will assume primary responsibility for assuring adequate supplies of oil for the independent segment of the industry."

⁹ For a more detailed expression of our position on the Board, see the statement presented by IFTOA at FEA hearings on "Guidelines for Granting Exception Relief", April 23, 1976.

¹⁰ See pages 2-4, above.

importers. In shaping the 1973 fee program the Federal Government recognized these facts and, in the light of past regulatory decisions, decided to provide for a period of transition, so that companies such as ourselves could adjust and make intelligent investment plans. As Deputy Secretary Simon, Chairman of the Oil Policy Committee, said on April 18, 1973:

Our objective was to design a program that would assure the oil industry flexibility to import oil to satisfy the short-term needs of U.S. refiners and the consumers while, at the same time, provide longer-term stability and additional incentives for increased domestic exploration and production and new refinery construction and expansion.

We knew that in designing this new program the special provisions, exceptions and subsidies in the MOIP [Mandatory Oil Import Program] would have to be ended. We realized that *this could not be done abruptly*, but would have to be done *gradually to avoid putting an unfair economic hardship on the numerous persons and companies that together have invested many millions of dollars in the domestic oil industry based on the policies under the MOIP.* (Emphasis added.)

We believe this was a wise policy then; it is now. This did not involve an insidious special deal. It was a policy based on reality and on a recognition of past Federal policies and of the role of independent importers in the petroleum market. It was a policy designed to provide an equitable transition and adjustment period, leading to the day when all importers, all consumers and all regions of the country would be treated equally.

Now FEA plans to abort this transition process and abandon the strong commitments made by the Federal Government in 1973, upon which the members of our Association relied in good faith. We should like to turn now to the impact of such proposal.

2. *Impact on Independent Deepwater Terminal Operators.*—If the FEA adopts the plan that is the subject of today's hearings, it will have a serious adverse impact on independent importers of petroleum products and will seriously weaken our competitive viability, in direct violation of Congressional mandate.¹¹ Our competitive position will be weakened because the FEA will permit our large customers to import product directly, thus by-passing our distribution and storage systems—the very systems built up over many years at substantial expense, with the encouragement of the Federal Government. We are perfectly willing—and so said in 1973—to be placed on an equal basis with all importers in 1980, when the fee-free licenses are phased out. But during this period of transition we believe that, in recognition of our historic, vital role in the oil industry, the program of fee-exempt allocations is warranted.

The fee-exempt licenses are not "special deals" or "special preferences". They should not be viewed with suspicion and outrage; rather for what they actually are: an incentive to independent terminal operators to build additional terminal and storage facilities. The current license system recognizes the role of the independent terminal operator in the fuel oil distribution system and is designed to strengthen that role.

During the months following the announcement of the fee program in 1973 we were assured, both publicly and privately, by Federal officials of the strength of the commitment made to us, and we were urged to build more storage capacity and increase our terminal and distribution capability.¹² We have done so. Since May 1, 1973 the members of our Association have:

Built or acquired 14 new deepwater and barge terminals, with a total storage capacity of 4.8 million bbls.

Built 11.1 million bbls. of new storage capacity—an increase of more than 20 percent.

Invested \$81.5 million in this new terminal and storage capacity.

In making these investments—many of which are still being paid off—we have relied on the assurance that we would receive fee-free licenses on a gradually reduced basis until 1980. We have met our commitment to the Government. The Government now proposes to abandon its commitment to us.

As we have indicated, the new program will have a profound impact on the competitive structure of the oil industry. The major companies, who have vast operations and a variety of ways to recover costs, will feel little impact. But independent importers such as ourselves, whose main business is reselling fuel oil,

¹¹ Section 4(b)(1) of the Emergency Petroleum Allocation Act of 1973, as amended.

¹² During that period, our Association met with the following Federal oil policy officials to discuss construction plans: William E. Simon, Deputy Secretary of the Treasury, George A. Lincoln, Director of the Office of Emergency Preparedness, and John Love, Director of the Energy Policy Office. The Presidential Energy Message to the Congress on April 18, 1973 also urged action that would result in "increasing our domestic storage capacity".

will suffer a significant drop in fuel oil sales and will thus sustain large financial losses vis-a-vis our major oil company competitors.

As we are weakened, so are the independent dealers who rely on us for supply and who benefit from the strong competition between us and the majors. So too will the consumer be hurt as the viability of the independents is sapped.

In summary, the independent deepwater terminal operators are preparing for the day when everyone will be treated equally. Until that time we believe that the Oil Import Appeals Board can deal effectively with problems of individual inequity and hardship. We have accepted the ground rules and the transition principle. We have planned our investments accordingly. Obviously, we are deeply disturbed and strongly opposed to an abrupt change in the rules and abandonment of the firm commitment on which our operations have been based and our funds have been invested.

3. *Long-Range Impact.*—We wish to restate our conviction that the FEA plan embodies a profound and far-reaching change in U.S. energy policy. If adopted, it will mark the end of any real attempt to achieve energy self-sufficiency and to reduce reliance on foreign imports. We frankly don't think the FEA has evaluated or understands the implications of its proposal.

The history of U.S. oil import policies since 1959 gives ample evidence that once an import barrier is removed, it is never reimposed. This will be the case with the \$1.05 per barrel fee in 1979. It will never go on. This is the keystone of future oil import policy. If it is not there, the impact on competition, independent marketers, refinery construction, storage capacity, crude oil production, and many other areas will be severe. Other witnesses will testify as to the impact on most of these operations; as terminal operators we can assure FEA that many of us will not go forward with construction plans for additional storage capacity.

We simply cannot understand why the FEA is willing to risk so much to gain so little. We cannot understand why FEA wishes to create so much uncertainty and disruption and undercut other major policy goals, while achieving almost no competitive or consumer benefits. When the current Oil Import Program phases out in 1980 any difficulties perceived by the FEA (and there are actually very few) will disappear; all importers and regions will be treated equally.

The proposed amendments to the Oil Import Program must be viewed in a wider perspective than has obviously been done.

4. *Procedural Objections.*—Among the perspectives that need to be brought to bear on this issue is that of other affected Federal agencies. In accordance with the provisions of National Security Clause Section 233 of the Trade Expansion Act of 1962, as amended,¹³ full review is required by the Secretary of the Treasury, Secretaries of Defense and Commerce and "other appropriate officers of the United States". Full public hearing is, we believe, required in the case of a change of this magnitude and importance.

We trust, therefore, that if the FEA decides, upon completion of its own review, that revision of the Import Program is warranted, the next step will be a full review and hearing by the other interested agencies, as required by Congressional statute.

III. CONCLUSION

In conclusion, the Independent Fuel Terminal Operators Association strongly objects to the proposed revision of the Mandatory Oil Import Program. It would represent a reversal of consistent Federal policies, undercut long-range energy independence goals, and seriously affect independent importers and marketers, including the members of our Association.

We trust, therefore, that upon review and reflection, the Federal Energy Administration will abandon this poorly conceived plan.

Thank you very much.

[Attachment A]

MEMBERS, INDEPENDENT FUEL TERMINAL OPERATORS ASSOCIATION

Belcher Oil Company, Miami, Florida; Blue Ridge Fuel Company, New York, New York; Bray Terminals, Inc., Albany, New York; Burns Bros., Inc., Brooklyn, New York; Cirillo Brothers Terminals, Inc., Bronx, New York; Colonial Oil Company, Jacksonville, Florida; Colonial Oil Industries, Inc., Savannah, Georgia; Deepwater Oil Terminal, Quincy, Massachusetts; Ergon, Inc., Jackson, Mississippi; Gibbs Oil Company, Revere, Massachusetts; Howard Oil Company, Inc., Maspeth, New York; Meenan Oil Co., Inc., New York, New York; Metropolitan

¹³ Section 1862, Title 19, United States Code.

Petroleum Company, New York, New York; Northeast Petroleum Industries, Inc., Chelsea, Massachusetts; Northville Industries Corp., Melville, New York; Patchogue Oil Terminal Corp., Brooklyn, New York; Seaboard Enterprises, Inc., Boston, Massachusetts; Southland Oil Company, Savannah, Georgia; Swann Oil, Inc., Bala Cynwyd, Pennsylvania; C. H. Sprague & Son Company, Boston, Massachusetts; Steuart Petroleum Company, Piney Point, Maryland; Webber Tanks, Inc., Bucksport, Maine; and Wyatt, Inc., New Haven, Connecticut.

The 23 companies listed above own and control terminals capable of receiving ocean-going tankers. None is affiliated with a major oil company. Members of the Association are independent marketers of No. 2 fuel oil, No. 6 fuel oil, gasoline and other petroleum products.

They distribute 40 percent of the No. 2 fuel oil consumed in New England and 25 percent of the No. 2 fuel oil consumed along the East and Gulf Coasts. They distribute nearly 60 percent of the residual fuel oil burned by non-utility consumers in New England and nearly 50 percent in the Middle Atlantic states.

The 23 companies own and control nearly 20 million barrels of No. 2 fuel oil storage capacity and nearly 30 million barrels of residual fuel oil storage capacity.

[Attachment B]

IMPACT ON CONSUMER PRICES

Based on existing import levels for residual fuel oil and projected levels for 1977, the 63 cents per barrel import fee on this product has virtually no impact on the cost of this product to U.S. consumers.

PAD I has 1.9 million b/d of fee-exempt import tickets for the period May 1976 to April 1977. During this time, total residual fuel imports are expected to be approximately 1.1 million b/d. For the period May 1977 to April 1978 fee-free tickets will amount to 1.6 million b/d and imports are estimated at 1.35 million b/d.

The situation seems to be similar in PAD V where last year fee-free import tickets for low sulphur residual fuel oil totaled 60,000 b/d while total residual fuel imports for the calendar year 1975 amounted to 30,000 b/d.

Thus, in neither of the two areas do consumers currently pay the cost of the import fee nor will they do so until some time in 1978 at the earliest. There may be some demand increase for imported residual fuel in PAD II because of the decline in natural gas availability. In this case, importers would have to pay import fees. But their needs could be met through issuance of fee-free tickets from the oil Imports Appeals Board.

In calculating the impact of the import tickets on ultimate consumers, it may be of interest that in New England, where the share of electricity generated by fuel oil is larger than in any other U. S. region, the savings to residential electricity consumers, if all residual fuel (foreign and domestic) had to pay the full import fee of 63 cents, would be about 35 cents per month. However, this is only a hypothetical number since it assumes that all residual fuel supplies are imported and full fees are paid. Actually, only about 60 percent of PAD I residual fuel supplies are imported from foreign sources and no importers pay any significant fees.

Mr. DINGELL. Mr. Craft.

STATEMENT OF DONALD B. CRAFT

Mr. CRAFT. Thank you for the privilege of appearing before you. My name is Donald B. Craft. I am vice president of Wyatt, Inc., an independent deepwater terminal operator located in New Haven, Conn. Wyatt serves fuel oil dealers and consumers in Connecticut, Vermont, and western Massachusetts. I am past president of New England Fuel Institute and am a member of its executive committee, board of directors, and fuel oil supply study committee. I am also a member and past president of the Independent Connecticut Petroleum Association.

I am appearing today on behalf of NEFI in response to the request of the committee to testify on the Federal Energy Administration proposal for establishment of a Strategic Petroleum Reserve. The

FEA plan was sent to the Congress on December 15, 1976, and, in accordance with the Energy Policy and Conservation Act, is being reviewed by this committee. NEFI is an association of 1,300 independent retail and wholesale home heating oil distributors throughout the 6-State region. These independent marketers serve over 2.4 million retail home heating oil consumers and market 85 percent of the 4 billion gallons of No. 2 home heating oil sold in our area at the retail level and 40 percent of the gallonage at wholesale. Seventy-one percent of all of New England's buildings and 74 percent of its population are heated by oil. Members of our association also market residual fuel oil at the wholesale and retail levels.

The New England Fuel Institute has for many years strongly supported creation of a strategic petroleum reserve. As marketers who experienced supply disruptions and shortages long before the embargo of 1973, we have been acutely aware of the need for adequate fuel oil storage and distribution facilities.

NEFI strongly supported the amendments to the Energy Policy and Conservation Act of 1975, which mandated creation of such a strategic reserve. We also supported inclusion in that act of the provision authorizing a reserve of refined products for regions heavily dependent on imports.

As an association of independent fuel oil marketers we have neither the resources nor experience to comment on all phases of the plan which was submitted to the Congress by the Federal Energy Administration on December 15, 1976. We are concerned, however, that the plan does not recommend establishment of a product reserve, and have some doubts as to whether the distribution system evolved by the FEA will prove effective in time of emergency or supply interruption, particularly one that might occur during the winter months.

NEFI therefore recommends that this committee carefully examine the necessity for establishing a product reserve for both No. 2 heating oil and residual fuel oil. If such a reserve is to be established, it must be based on the following premises:

First, the storage facilities must be placed in or near the areas of highest fuel oil consumption. Obviously this means that substantial storage capacity must be created in the six New England States and elsewhere in the Northeast.

Second, the facilities must be capable of quick integration into the existing distribution system. This means that they must be located at deepwater and inland terminals, where they can easily be connected to pipelines, barge docks, and distribution equipment through which fuel is made available to the ultimate consumer.

Third, the facilities must be of sufficient capacity to act as a "surge tank," in other words, the role of product storage must be to maintain inventories from the terminal to the consumer at safe, operating levels in the early weeks of a crisis. This is the period when foreign product has stopped flowing and domestically refined product has not yet been diverted and allocated to our region.

In this connection, NEFI wishes to underscore the importance of an effective crude oil and product allocation system for use during a supply emergency. Such a system is obviously an essential element of the storage program. We in New England are anxious that it assure the delivery of domestically refined product before the product storage system has run dry.

Fourth, the product storage system must be fully financed by the Federal Government. This is essential to the survival of the independent sector of the fuel oil market; it is vital to the consumers of New England. As the committee is well aware, the FEA has been given the authority to create a product reserve under the Industrial Petroleum Reserve, section 156 of Public Law 94-163; under the IPR, importers rather than the government would be forced to acquire, store and maintain up to 3 percent of their total imports of product. Obviously this would be expensive and would increase the cost to the importers and the consumers they serve.

NEFI is strongly opposed to the use of the IPR to create product storage for the following reasons:

One, it violates the basic premise of the strategic storage plan, that this is a national security matter, requiring equal cost sharing by all parts of the Nation. In accordance with this premise, the costs of any storage should be borne by taxpayers in all regions, not just the consumers in one. Certainly this winter has proven that no part of the Nation is an energy island. New England has borne additional costs to provide additional electric power and natural gas to other regions of the country; other regions have been sharing costs with the Northeastern areas that consume No. 2 heating oil. In brief, the Nation has responded with a shared effort to meet the current energy crisis; we believe it must share the cost of preparing to meet a future crisis.

It would force consumers of fuel oil in New England and the Northeast to pay higher costs each winter. As the committee knows, the nine States of the Northeast consume more than 60 percent of the Nation's No. 2 heating oil and 64 percent of its residual oil. If importers into this region are required to maintain large volumes in inventory at their own expense, this expense will have to be borne by their customers in the form of higher prices, every year, for many years to come.

It will weaken the competitive position of independent fuel oil marketers. The IPR will place independent importers at a serious disadvantage. Since these independents are almost exclusively in the business of reselling fuel oil, they have a limited cost base over which to charge increased costs. The major oil companies with whom they compete obviously sell many other products and have vast operations and could spread the increased costs of storage over a much broader base. Thus, in order to compete, the smaller independent companies would not be able to recover the costs fully and their market position would be weakened. Anything that weakens the independent segment of the business—the segment which handles 40 percent of the wholesale fuel oil volume in New England—is a threat to the survival of independent retail dealers, who rely on these wholesalers for a competitive supply of fuel oil.

In summary, NEFI is strongly opposed to the use of the Industrial Petroleum Reserve as a means of creating a product reserve, and recommends that the full costs of building and maintaining such a product reserve be borne by the Federal Government.

However, NEFI does believe that private companies can and must play a significant role in providing additional storage facilities that will help to reduce the impact of any future embargo or supply disruption. NEFI members and other fuel oil wholesalers and retailers

have already done much. We have continued to build storage tanks at deepwater terminals and inland distribution terminals. NEFI estimates that independents alone have, since 1973, added more than 5 million barrels of new fuel oil storage throughout New England.

As a matter of fact, my own company placed an order for steel yesterday for an additional 200,000 barrels of storage.

But much more needs to be done, and the Federal Government can do much to encourage private companies to add to existing capacity. Accordingly, NEFI strongly recommends the following four steps:

First, an expansion of the investment tax credit to encourage additional construction of steel storage tanks, for No. 2 and No. 6 oil, at terminals owned by wholesalers and retailers. In addition, a tax credit should be provided for investment in insulation of existing storage facilities, a step which could save substantial volumes of fuel.

Second, a tax credit for homeowners who wish to increase storage capacity in their homes.

Third, continuation of the fee-free licenses granted under the mandatory oil import program. The fee-free program for product imports was established by the Federal Government in 1973 to provide an incentive to independent deepwater terminal operators to construct new storage capacity; these operators have responded and have built more than 15 million barrels of new tankage along the East Coast. FEA is considering elimination of the license-fee program—a step which would clearly discourage construction of additional storage capacity.

Fourth, maintenance of a free market, without mandatory price and allocation controls. Price and allocation controls were a significant deterrent to construction of much-needed additional storage. Under those controls, which were removed last summer, marketers could not contract to buy the additional supplies needed to fill their storage tanks to capacity, nor could these marketers recover the cost of building new storage. In brief, price controls rewarded a company for not building new storage tanks and not maintaining full inventories.

In conclusion, the England Fuel Institute wishes to commend this committee and its chairman for reviewing this very critical issue. We are hopeful that these hearings and your review will lead to development and implementation of an effective strategic petroleum reserve plan—one that will protect all regions of the Nation, including New England, and consumers of all petroleum products from the threat and reality of a future embargo or emergency. We pledge our cooperation in this vital effort to insure the future energy security of our Nation.

Thank you very much.

Mr. DINGELL. The committee thanks you for your helpful testimony.

The Chair recognizes the gentleman from Massachusetts, Mr. Markey.

Mr. MARKEY. Thank you, Mr. Chairman.

I do not have any questions at this time. I do want to say that I am in great sympathy with the points that have been made by the two preceding gentlemen about the need to have a storage capacity accessible the east coast and New England, and the need to in some way or another maintain an adequate level of refined product so we do not have to become totally dependent upon crude supplies which can

easily become unavailable if unreasonable delays occur, as they did in the 1973-74 oil crisis. I am in great sympathy with their points.

Mr. DINGELL. The Chair thanks the gentlemen.

The Chair recognizes counsel.

Mr. DEMAREST. Mr. Alford, earlier in your testimony, it was suggested that we should not permit the Strategic Reserve Program to become a substitute for industrial storage that should take place independent of any Federal storage program. And there was also a suggestion that perhaps part of the need for regional storage in New England is related to a lack of adequate industrial storage facilities there.

Would you agree with that assessment?

Mr. ALFORD. In the first place, I agree that the strategic residual petroleum reserve should not stop any development or construction of additional tankage that is needed to operate the system economically.

You just heard testimony that 15 million barrels of new tankage has been built by the terminal operators of the east coast. I think that is a significant addition.

Our own company has built a large 300,000 barrel tank since the end of the Mideast war, bringing us up to a total of 2.3 million barrels of storage.

It is clear that the storage system in New England and, I think, the whole east coast for residual fuel oil, No. 6 oil, and No. 2 oil was designed based on the assumption that the supply would be continuous. In other words, we did not have, we never had in this country a strategic storage system constructed by each industry.

Industry has built more storage because, among other things, our demand has gone up more, and we will continue to build whatever we see is necessary. However, the current system will not work as a strategic reserve unless it is propped with something that would insure a supply in the event of a complete disruption as we lived through in the Mideast war.

So I believe FEA in saying industrial storage is needed is raising a strawman. I do not think the facts will bear them out at all.

Mr. DINGELL. What percentage of the New England storage system is full? Or what is the level or percentage of volume which holds oil and which does not hold oil?

Mr. ALFORD. Mr. Chairman, let me try to answer that by talking of my own company which I am familiar with the facts and I suspect—

Mr. DINGELL. I suspect your company might be more frugal and more prudent than others. I find it hard to extrapolate from what your company is doing to what the rest of New England does.

Mr. ALFORD. For instance, in our own case, if all the tanks are full and we are burning at the very low burn rate, we have about 30 days of storage capability. However, last month, we were sending power to your State of Michigan by wire—oil—residual fuel, by wire. We had the highest burn rate we had in the history of the company, because it was not only cold in New England, it was cold in the Midwest, and midwestern utilities could not get the coal into their generators.

With that type burn rate, and with one or two ships missed—and you know there were some ships that sank coming into New England this winter—when there is a storm at sea, when you have an exceedingly high burn rate, and anything happens which affects the normal

chain of events, we normally are running somewhere on the average of about half of our maximum supply, which puts us at about an average of 15 days.

I looked back all of the last year to see what was the lowest amount which we had in storage at any one time, if we had been burning at the maximum burn rate. The lowest we would have gotten at that burn rate would be as low as 5 or 6 days.

Other systems that may have built more nuclear plants or something of that nature, or that had storage for large oil-fired generators may have more days of storage in place.

On the average, I think probably you would find, if you look into it that, there is about 30 days of storage if everything is full; and on the average it is never full because you are always burning, and you have ships coming and you have ships that do not meet schedules and that sort of thing.

So our numbers run—and I think the industry average is somewhere about 50 percent. That is, the normal way this system runs is 50-percent full, and that is why New England and PAD I are not set to take a 7 or 8 week disruption.

We have just got to have the strategic storage of residual or No. 4 oil to make the system work.

Mr. DINGELL. You said your company—

Mr. ALFORD. Our company is New England Power Co. of Massachusetts.

Mr. DINGELL. The Chair recognizes Mr. Demarest again.

Mr. DEMAREST. You have indicated that approximately 15 days' supply is the average for your company. You believe that may be representative of New England. Is that supply stockpile similar to the kind of stockpile that is experienced in other regions, or is experienced by other electric utilities who use coal, for example, rather than oil?

Mr. ALFORD. When I said 15 days, remember I said 15 days at the maximum burn rate. If we burn at a much lower rate, as we do in the springtime or in the fall, then generally we have more than 15 days.

It is my understanding that most utilities that burn coal—and we shifted to coal during the Mideast war because we literally had run so short of oil throughout New England and throughout the east coast that those utilities who could—we were one of them—shifted to coal. We burned about 1.5 million tons of coal through 1974 and 1975, until the provision in EPCA that allowed EPA to give an exemption from the State implementation plan expired, and then we had to quit burning coal.

Mr. DINGELL. Could I hear that last statement again, about EPA?

Mr. ALFORD. In EPCA there was a provision that EPA could bypass the State's implementation plan of the Clean Air Act, and we applied to EPA to bypass our State's clean air plan because we could not comply with, and still could not comply with, our State's plan and burn coal.

The State's implementation plan is designed so that it is met if we burn oil, not coal. There was a provision in EPCA that expired on June 30, 1975, which allowed us to burn coal. I testified before this committee last year, Mr. Chairman, asking to get that provision

extended so we could continue to burn coal; however; we were not successful in that.

When that provision expired, we ceased burning coal because we would no longer comply with the State implementation plan under the Clean Air Act.

To finish my answer to your question, sir, most coal-burning utilities have to have 2 or 3 months of coal on the ground because they anticipate these extremely long coal strikes. So the way that business operates, they do have, generally, more coal on the ground than we have, say, oil in our tanks.

There are no strikes in the oil business and there never had been. There had never been disruptions until we lost control of the oil market.

Mr. DINGELL. With all respect, you do have embargoes as to time.

Mr. ALFORD. As I say, we have had one, and I am trying to explain the difference between utilities which burn coal and keep 2 or 3 months of coal on the ground, and utilities which burn oil. Up until the Mideast embargo there had never been any disruption, even in the wartime, of oil supplies. Now we agree there will be future disruptions.

Mr. DINGELL. If we agree there are going to be future disruptions, we seem to be down to the point—I am not saying whether or not it is my position—we seem to be down to the point. In one instance you say to the coal-burning utilities, “Fellows, you are going to have to stockpile your own.” But to people who keep residual fuel oil—we say, “No, the Government is going to keep it for you.”

I am curious. There is a distinction here that may not be merited.

Mr. ALFORD. Mr. Chairman, the Congress mandated FEA to come up with a strategic petroleum reserve, and we think for good reasons, and we supported that in the Congress.

Mr. DINGELL. I remember that; but we have several sections. One is the strategic petroleum reserve; the other is the early petroleum reserve.

Do both of you gentlemen say it is justified? To the second you say it is not quite so.

I am curious why we should tell the folks who burn coal, “Fellows, you might stockpile because you might get a strike,” and in the other instance, the folks who burn resid, we say, “You do not have to do that. The Government does it for you.”

OPEC or Venezuela might shut off the resid. How do I justify that distinction?

Mr. ALFORD. I will tell you how I would justify it. I am not sure you would be able to use it.

We have 2 months of coal on the ground right now, and we cannot even burn coal. We chose to keep 2 months of coal on the ground because it is the only way we could see to insure the same thing did not happen at the next embargo; that could be a lot worse than the last one.

You can store coal on the ground; you do not have to put it in tanks. You do not have to build tanks.

If we are ordered to build an industrial storage for residual fuel oil, there is one obvious disadvantage compared to a strategic residual storage in New England or anywhere else. It is the same disadvantage, Mr. Chairman, that you would have if you ordered every refinery in this country to build 90 days of crude storage.

The fact is that you can do it much more cheaply under the Government's program of a strategic crude reserve, and we concur with doing that. We think that is the right way. The same people are going to pay for it whether it is the consumers of all the petroleum products in the country or whether it is the consumers of electricity.

It is cheaper to build it as a strategic reserve—the studies have indicated that—than it is to put up steel tankage. We know what that costs.

Mr. DINGELL. I have, within the past week or so, expressed considerable concern because these refineries are designed to burn gas.

Mr. ALFORD. Some of the refineries certainly do.

Mr. DINGELL. The refineries I have particular problems with were. We do have a little different situation than the kind that you are referring to.

Mr. ALFORD. I am supporting the crude oil strategic reserve program in the gulf coast because I think it makes good sense as a way to providing 90 days of crude oil to all of our refiners.

The way FEA has structured that part of it, I think it will work, and be cheaper than if you order each refiner to build their own industrial reserve, if you want to call it that.

In the same fashion, it is cheaper to build a strategic residual reserve in New England than it is to order every company, including the terminal operators and utilities, to build their own 60 days' supply.

If we had not had an assured supply, I sense we probably would have gone that way. The European nations certainly went that way. Now we have an opportunity to do it right.

What bothers me is that FEA's plan is not taking advantage of this opportunity to do it right, except in the crude oil. There they did.

Mr. DINGELL. Let me raise another question here.

In comments—I forget whether it was in your statement, Mr. Alford, or in Mr. Craft's statement—you indicated the fact there are abandoned mines up in Newfoundland that are available for storage.

Mr. ALFORD. That was in my statement, sir.

Mr. DINGELL. I have got a problem with your statement: We have trouble with Arabs and they shut off our oil. The Canadians have trouble with the Arabs. How would we be assured the Canadians are not going to refuse to export oil to us and burn it at home?

Mr. ALFORD. Mr. Chairman, I testified before your committee, again, that the Arabs looked like they were just child's play compared to the Canadians.

Mr. DINGELL. Michigan gets oil.

Mr. ALFORD. I know you do.

Mr. DINGELL. I suspect we are more dependent on them than you are.

Mr. ALFORD. We had a contract with a Canadian oil company. The first people that cut us off cold during the embargo were the Canadians. I said in my statement that there is an alternative strategic storage location, and it just happens to be in Newfoundland. It is an old abandoned iron mine. Some people came to me with their plans. I said, "Fine; you should go to the FEA; they are the ones looking for strategic storage."

They said, "We have been there and they did not like it too much."

I have great reservations about storing a barrel of anything in Canada, because last time the Canadian Parliament passed a law stating that oil would not be shipped unless it were in the Canadian interest to do so. Even though the crude was coming from Venezuela and being refined in a refinery that our company's contract helped pay for, they said, "We are not going to send it out unless you pay whatever the spot market price is."

Mr. DINGELL. I seem to recall your complaint on that point to this committee.

Mr. ALFORD. I have very grave reservations of storing anything in Canada; however, look at what the FEA has come up with: Instead of looking at Canada they are having us completely dependent on the Caribbean.

Mr. DINGELL. I am not sure that I trust the Caribbean refiners more than I trust the Canadians.

Mr. ALFORD. I do not either. However, I much prefer a treaty that would assure our access. If FEA is going to use the argument that it is too expensive to put in a strategic residual reserve, I would prefer a treaty with Canada and residual storage which I knew we could get our hands on, over a refinery that may be doing something else 5 years from now in the Caribbean.

Mr. DINGELL. Gentlemen, the committee thanks you.

Mr. CRAFT. One favor, Mr. Chairman. I wonder if the testimony submitted on behalf of the Independent Fuel Terminal Operators Association before FEA could be part of the record?

Mr. DINGELL. That is already in the record. [See p. 208.]

Gentlemen, thank you both.

Our next witnesses are going to be a panel on environmental issues, Joseph Cole, Petrochemical Ecology Committee of Louisiana; Mr. Kenneth S. Kamlet, counsel, National Wildlife Federation.

Gentlemen, we are pleased to welcome you. If you would each identify yourself for purposes of the record, we would be more than pleased to receive your statement.

STATEMENTS OF JOSEPH W. COLE, JR., PETROCHEMICAL ECOLOGY COMMITTEE OF LOUISIANA, AND KENNETH S. KAMLET, COUNSEL, NATIONAL WILDLIFE FEDERATION

Mr. COLE. I am Joseph W. Cole, Jr., from Fort Allen, La. I am here to speak on behalf of the Petrochemical Ecology Committee of Louisiana, in connection with the proposed strategic petroleum reserve.

I have a prepared statement, Mr. Chairman, which I have furnished to the committee.

Mr. DINGELL. Without objection, your full statement will appear in the record, sir.

Mr. COLE. Thank you, sir.

I am, among other things, an assistant district attorney for the 18th Judicial District of Louisiana, which includes Point Coupee, West Baton Rouge and Iberville Parishes—counties—of Louisiana. I also represent, as a private attorney, the R. D. Phillips family who constructed the first salt dome storage for LP gas in the State of Louisiana at Gibsland, La., many years ago.

I am here today as a part of a committee of citizens who have banded together to protest the presently planned implementation of the ERS plan of the FEA.

Let me be plain, for the FEA will, as they have in the past, try to imply that this opposition stems from financial motives. I first learned of this program by reading about it in the Wall Street Journal. Mr. Rawlston Phillips, who flew all night to be here today, and I, came to Washington last spring to investigate the possibility of participating in the program on properties which he and his family still own.

In April of last year we were told that the site selection had been made at the same time that the first report was issued to the Congress.

Let me say now that neither he nor I has any interest in participating in the program as it is presently designed.

There is today in the United States a substantial storage industry storing in salt and other underground reservoirs. Propane, butane, methanes, ethylenes and other gases are stored in large quantities.

There is no doubt in my mind that given the opportunity, the petrochemical industry can store the crude oil necessary to meet the Nation's demands. They have been asked to do so in this case but have not responded. Why? For two basic reasons:

One, the time framework set up by Congress to implement the program is too short and the present life of the agency, fixed by Congress, precludes them entering into a contract long enough to amortize the cost.

Two, it is impossible for the operator to insure himself for an amount sufficient to meet his exposure.

In addition, should the industry, in attempting to follow the present plan, have a major spill of oil, 30,000 tons or more in the wetlands, the possible overreaction from the various Government agencies—EPA, Coast Guard, CZM, Fisheries, and so forth—could put the whole industry, which is essential to the largest petrochemical complex in the world, in jeopardy.

The people at FEA are not altogether to blame for this state of affairs. The time limits imposed by the act force activity on bureaucrats, but an alternative has been suggested by an organization in whom I have confidence, the National Wildlife Federation. I have copies of their letter to the President, sent only last week, which, if implemented, may allow the FEA to proceed in a more reasonable manner to fulfill its obligations. [See p. 249.]

Let me say that I do not oppose the concept of a strategic petroleum reserve program. The only way to store the quantities of crude required is underground, and the only way to move large quantities of oil is by pipeline.

What I do object to is the manner in which FEA proposes to go about it, for the following reasons:

One, transportation. At no time does the Agency address itself seriously to the transportation of vast quantities of oil, up to 1 billion barrels or 420 billion gallons, to and from the storage sites. Bear in mind that this would be done in addition to the seven million barrels presently being imported each day into the United States.

We know that it will be imported in the United States by tanker. Approximately 60 tankers of the size of the *Argo Merchant* would be required to move the oil proposed only for the first site at Bayou Choctaw. We are told that three-fourths of the total to be stored in

Louisiana would be funneled into the Mississippi River which serves as the only outlet to the Gulf for both the second largest port in the Nation, New Orleans, and the seventh largest port, Baton Rouge.

At least one-half of the Louisiana—that is, Cote Blanche and Weeks Islands—total will be, we are told, offloaded into barges and moved through the intercoastal waterway, which is already crowded, across miles of the most valuable marsh and estuarine area in the world. I am told that “the industry” will handle this part of the program.

In Louisiana in the last 2 years we have had a barge knock out the U.S. Highway 51 bridge across Pass Manchac, and the Lake Pontchartrain Causeway has been broken twice. Small collisions and minor accidents take place every day.

Last year a tanker bound upriver hit the ferry at Luling, La. with the loss of 70 lives.

In our view, the proposed sites are inherently wrong. They are sites which must be classified as being among the highest risk sites available for the project. They are each and every one located in the vast wetlands of south Louisiana, which must be classified as among, if not the most, valuable in the world. In these areas a major spill is almost impossible to contain, and it is impossible to clean up. Each of the sites is subject to flooding from the rivers which pass almost 50 percent of the surface runoff water of the entire 48 States, and are also subject to annual danger of hurricanes and high annual rainfall.

Last and not least, every dome selected already contains cavities designed for the storage of relatively small quantities of LP gases or resulting from brining operations of dry mining of salt.

Lastly, the storage cavities which the Agency proposes to use are not designed to store crude oil. Only one such facility exists in the United States today, and that one is near Venice, Louisiana, and was built as a crude facility to serve a refinery on the site after the above-ground storage was demolished by a hurricane. The Germans and the French are far ahead of us in this field and have designed their facilities for the task of storing crude and moving it within the country in such a manner as to minimize the risks.

Third, alternate sites: The Agency dismisses almost without comment the fact that substantial alternative sites are available in the East and upper Midwest where the need for imported crude is greatest.

Fenix and Scisson, Inc., one of the Agency's own consultants, has constructed storage in granite, limestone, shale, chalk, and dolomite totaling millions of barrels over the years from 1954 to date.

Oil could be stored at the sites for use in refineries in the area, and the need for transshipment at highcost and greater danger to the environment both in Louisiana and the ultimate use sector could be avoided.

In the event that the storage must be in the gulf coast region, then there is a second band of salt domes lying just north of the coast, as can be seen by reference to plate 181 of the national atlas published by the Department of the Interior. These domes are also located near the three major oil pipelines and are situated in dry, upland areas where no brining operations are taking place and where a spill can be contained, the oil salvaged and an effective cleanup is possible.

Four, as to the future of the dome, we are not given any plan for the continued use of the domes to be taken by the program.

Every dome in the present program is being used at this time by either the petroleum industry or the petrochemical industry at this time.

Almost 80 percent of the total oil and gas production in south Louisiana is concentrated on the flanks of these and similar domes. There is production around each of the domes in question.

What effect will the storage program have on this production, on water, flood and other secondary recovery programs and new exploration around the domes? There will be some; what and how much, I do not know; and what is worse, the Agency doesn't know. They do not seriously address this question in any of the materials I have seen.

We have not seen the plans for replacing the brine on a long-term basis to the industrial plants which use it for feedstock. The chlorine which comes from this brine is a basic feedstock to many of the plants in this locality.

We have further been given no explanation as to where industry will store the products which it presently has in storage.

Five, as to spills, the plan as a whole and the Site Impact Statements do not even admit the possibility of a major spill. It is clear that a major spill of oil or of the brine created by the construction would have a very damaging effect on the ecology of large areas of the wetlands of south Louisiana.

We have nothing to go on except the studies made for the Superport which were made for the Loop Consortium by LSU. Those studies indicate that at least one major spill offshore and one onshore must be anticipated, and the results would be the destruction of some 70,000 acres of marsh and estuary.

We also have the experience of the storage and brining industry, when major structural failures have taken place at Bayou Choctaw, Sorrento, Arcadia, Gibsland, the Cargill Salt Mine at Bell Isle in St. Mary Parish and Grand Saline, Tex.

When these facts are taken with the fact that this whole operation is to be undertaken by the Federal Government, it becomes apparent that Murphy's law may well apply.

Of particular interest at Bayou Choctaw is the disposition and storage of the brine created by the construction of the facility. Seven gallons of saturated brine are created to make one gallon of storage capacity. It is proposed that this large quantity of brine is to be disposed of by injection into salt-water sands at 5,000 feet. The disposal site is just south of the old Bayou Choctaw oilfield, and when this sand is pressured up around the old wells, will the old, rotten casing collapse and allow the salt water to migrate up to the freshwater sands which serve Baton Rouge, La., a city of almost 400,000 people? I do not know, and although some technical people fear it will, the Agency is not very reassuring.

Lastly, there is proposed an open brine storage pond of 500,000 barrels. We at home remember when Hurricane Betsy brought sea water only one-fifth as strong almost 100 miles from the gulf and killed all the pastures and browned the leaves on the trees. What would happen if a storm were to hit this pit? We do not know, and we cannot find out.

What are we risking? The swamp, marsh, both salt, brackish, and fresh, and the adjacent estuarine areas compose almost one-third of the total land area of Louisiana. They are, if only by size, the most productive wetlands in the United States. In addition to the production of shrimp, oysters, fish, and fur, they overwinter a substantial portion of the waterfowl which winters in the United States.

They have to date been much abused by man. Exploration for oil and gas, navigation channels and the leveling of lifegiving rivers have all taken their toll.

The gulf coast marshes were one of the principal reasons for the enactment of the Coastal Zone Management Act.

We in Louisiana have begun to understand and attempt to curb our own excesses. We cannot cope with the intervention of the Federal Government, hence the title of the publication of my group, "A Plea for Sanity." We did not wish to be the dog in the manger. As I said at the start, please slow this train down before it jumps the track in such a manner that it may destroy the very way of life of hundreds of thousands of south Louisiana fishermen, trappers, and those others who are dependent on the renewable resources of our home for their livelihood.

I would ask the Chair that the pamphlet published by my group, "A Plea for Sanity," which I furnished to the staff, be made part of the record of this hearing.

Mr. DINGELL. Without objection, that will be done.

[The document referred to follows:]

A PLEA FOR SANITY

(A Report Designed to Alert the Public to a Potential Disaster on the Gulf Coast—Petro-Chemical Ecology Committee of Louisiana)

SAVE THE WETLANDS

The federal bureaucracy has taken a congressional mandate to protect the U.S. against another "oil embargo" as a mandate to bypass all environmental—and even Constitutional considerations in its haste to store up to One Billion barrels of foreign bought crude oil in the Wetlands of South Louisiana.

The very existence of the delicate ecosystem of the South Louisiana Wetlands—including the fisheries, fur industry, and endangered species—is threatened.

Under Public Law 94-163, Section 155, 500,000,000 barrels of crude oil will be stored, 150,000,000 barrels of it by July 1977. The law was passed to insure the U.S. a 150 day supply of crude oil should another "oil embargo" occur.

Because of the congressional deadline, the FEA is hastily making decisions to store this incredible volume of oil in the salt domes in the Wetlands of the Mississippi embayment. These domes have been used to store other hydrocarbons, mainly propane, and methane, which if spilled evaporate or at worst burn rapidly and cleanly. No crude oil has been stored in U.S. salt domes.

Ten million barrels is the largest amount of product ever stored in any one salt dome, see report of Louisiana Conservation Commission—Sorrento Dome.

The FEA proposal is predicated on the faulty assumption that these salt dome formations are stable and that salt, as a mineral, is predictable. In fact, these Wetland domes (the youngest in the country) are still in the unstable formative stages.

Salt "has wild mechanical behavior", according to the director of the Rock Mechanics Laboratory at Pennsylvania State University. (See L.S.U. "Salt Dome Utilization and Environmental Considerations").

In addition, the preparation and use of salt domes for oil storage involves the creation of a phenomenal volume of brine, a solution with five times the salt content of sea water which is itself lethal to the eco-system.

To dispose of the brine, the FEA proposes injecting it into adjoining aquifers. At one selected site, brine will be injected into the bottom of an aquifer which could adversely affect the aquifer which supplies Baton Rouge (pop. 400,000) fresh drinking water. [See Appendix A for explanation of solution mining and preparation of caverns for oil storage.]

When needed, this 500,000,000 (initial estimated purchase), will be pumped out in 150 days.

That's 3,333,333 barrels pumped EACH DAY for 150 days. It takes six months for Louisiana to produce that much oil. No one has ever contemplated moving this volume of oil in this short time frame.

A spill of .001 percent will spell disaster.

In this vast, marshy estuarine area, any oil spilled will meander with the slow methodic currents throughout the Wetlands, destroying as it goes.

When the oil has been pumped in and out of the domes up to five times, (each time expanding the caverns and weakening the dome), the domes are going to be hailed as ideal storage places for nuclear waste.

We do not argue with the practicality of storing this crude oil in salt; however, we do believe that the South Louisiana band of salt domes are the least suitable for this project.

We are trying to convince Congress and the FEA to look more closely at the northern band of domes located in dry areas and inbedded salt throughout the country and persuade them to more realistically consider the consequences of contaminating the Wetlands.

The FEA acknowledges, "Wooded swamps along rivers and streams . . . (are) particularly sensitive to changes in ground and surface water levels and salinity." (FEA-S-76/346, p. 2-99.)

Terrebonne Parish, downstream from Bayou Choctaw, accounts for over 100 million pounds per year of commercial fish harvest worth over \$10 million dollars annually. The primary food for these fish, detritus, is produced by the coastal marsh grasses and forest swamp vegetation. (Appendix B, H)

Louisiana leads the United States in wild fur production, with South Louisiana contributing 40 percent of the total catch each year. Species affected in the salt dome areas include muskrat, raccoon, opossum, gray and red foxes, bobcats, mink and otter.

As a field-wizened engineer said: "Storing oil in the Wetlands is like checking your gas tank with a match—it may not go, but if it does—you're in a heap of trouble."

We have prepared this report to point out some of the misconceptions of the FEA concerning this project. Please read it and then plan to work with us to rescue the Wetlands.

WHY THE WETLANDS?

The FEA has six guidelines for choosing salt dome sites for the Early Storage Reserve Plan, a crude oil stockpiling program.

They are:

- Short term (i.e. 3 years) and ultimate capacity
- Accessibility to Distribution system (Location on pipelines)
- Freedom from technical restrictions (bypass E.P.A. and State regulatory bodies)
- Extent of environmental impacts
- Feasibility of Acquisition
- Costs

Currently under consideration are the salt domes located at West Hackberry, Cameron Parish; Bayou Choctaw, Iberville and West Baton Rouge Parish; Napoleonville Dome, Ascension Parish; Cote Blanche Dome, St. Mary Parish; Byron Mound, Brazoria County, Texas, and Kleer Salt Mine in Van Zant, Texas. The last location is located in Grand Saline, Texas, which experienced a salt dome cave in last year. A hole 80 feet wide opened up in the ground. The resulting change in the pressure on the aquifer caused the creation of saline springs—one of which popped up in the middle of a street.

All six domes, except the Grand Saline site, are in low lying coastal areas, historically the most unstable geologically, subject to hurricanes, high winds and annual flooding.

Let us examine the assumptions of the FEA concerning site selection. No actual tectonic and hydrologic testing nor engineering studies have been done to determine the structural integrity of any of the domes, nor was any special note made of the fact that these domes are, for all practical purposes, surrounded by water making it very difficult to control spills of both brine and oil.

CAPACITY

FEA Claim: "Salt domes with existing cavities (are) candidates for ESR because they require less time to prepare for oil storage. Approximately 900 cavities with a total capacity of 300 million barrels are known to exist in salt domes and bedded salt formations. In some cases it is feasible to enlarge existing cavities or to leach additional cavities at selected sites."—FEA/S-76/346—"Strategic Petroleum Reserve: Draft Environmental Impact Statement for Bayou Choctaw Salt Dome, DES 76-5, Sept. 1976 (Bayou Choctaw Report).

Answer: No crude oil is being stored at any site, only liquefied petroleum gases. Much of the available capacity they are counting on is already committed to the private petro-chemical industry and will have to be condemned and taken. This will not only deprive private industry of the storage space it developed, but will use up much time and energy which could be spent on developing dry area domes specifically for the purpose of holding large quantities of crude oil. Most current facilities contain butane, propane or methane. NO crude oil has ever been stored in the domes. Some caverns, created by solution mining for brine, are available but are not designed for crude oil storage.

Allied Chemical and other private interests now own and operate Bayou Choctaw and the FEA seems to assume this facility is theirs for the taking.

The FEA only has life until 1985. Therefore, it cannot enter into long term leases and must buy properties it may only need for a few years—unless the Congress decides to use these same salt domes as storage for nuclear waste.

The northern band of Gulf Coast Domes, as well as salt in New York, Illinois, Ohio and Michigan are located in dry areas where levees can more easily contain spills. These sites could be specifically engineered to hold crude oil. (See: Fenix and Scisson, Inc. (the Government's contractor) current Published Project Summary) These areas do not contain the delicate and unique eco-life chain of the Gulf Coast Wetlands, which are the most important in the world.

ACCESSIBILITY: (LOCATION)

FEA claim: In a report by Dr. C. W. Craven, Jr., Manager of the Oak Ridge Office, Science Applications, Inc., given at the "Salt Dome Utilization and Environmental Considerations" Seminar at the Institute for Environmental Studies at Louisiana State University, November 22-24, 1976 (LSU Dome Seminar), proximity to the three major pipelines and the Gulf Coast refineries was given as a primary reason for the site selections.

Answer: The salt domes in dry areas in the northern Gulf Coast band are also located near Capline. Sixty (60 percent) of the oil stored in Louisiana will be shipped to the industrial Northeast and the Caribbean where Fenix and Scisson claim alternate storage sites are available.

Some of the remainder will go to Texas. With \$300,000,000 allocated for the first state of the ERS, a pipeline could be built from Capline to the Northeast domes or from the Atlantic coast pipelines to the domes. Historically, pipelines have proved to be the safest, cleanest method of moving large quantities of oil. However, no calculations have been made of the amount of energy required to move this volume of oil.

The FEA ignores the fact that the Wetlands are subject to floods, hurricanes, tide changes and winds. An oil spill of 50,000 to 500,000 barrels in the middle of a 65 mile an hour hurricane boggles the mind. The Gulf Coast sites are not strategically safe. By very simple sabotage acts (blowing a hole in the levee or opening locks at Port Allen) the sites would be inundated with water and the oil would be inaccessible. The U. S. Army Corps of Engineers (New Orleans District) is presently engaged in an emergency levee enlargement program on both the Mississippi and Atchafalaya rivers as a result of the near disastrous major flood of 1973, at a cost in excess of \$500,000,000. (Appendix "B")

Using domes in the oil-rich Wetlands for storage could preclude further exploration for new sources of domestic oil on the flanks of these domes. Drilling or other subsurface exploration could easily drastically affect one of the domes, rendering the entire area unusable for storage or production. (Appendix "C")

TECHNICAL RESTRICTIONS

FEA claim: The FEA says pressing deadlines force it to bypass technical restrictions in the name of speed. (LSU Dome Seminar; Early Storage Reserve Plan—Public Law—94-163 Section 155, April 22, 1976, P. IV-11)

Answer: We maintain that for the safety of the environment as well as people, certain technical and engineering guidelines should be established for the creation of caverns for crude oil storage. For instance, the FEA proposes using a "fill while leaching process" (Early Storage Reserve Plan, Public Law 94-136, section 155, April, 1976-ESRP-), a process untried in the industry.

Dr. Reg Hardy, director of the Rock Mechanics Laboratory of Pennsylvania State University says, "Salt is one of the most complex geological substances known. It has wild mechanical behavior. We don't know what is going on inside a cavern. We are very lucky we haven't had a spectacular problem. We do know one thing: Never put a hole in the ground and assume it will be stable. When you drill that hole, you are talking about a change in the equilibrium structure of the whole earth's surface."

EXTENT OF ENVIRONMENTAL IMPACT

FEA claim: The following two pages of the Draft E.I.S. which are duplicated here serve as an example of the type of environmental considerations which are being given the project by the FEA.

Answer: Spills—At worst, those preparing the FEA study say they expect a total spill of 7,000 barrels. The federal government defines a *major* spill as 240 barrels or 40 tons of oil. This volume of oil or brine could in one day cover one square mile and in five days $3\frac{1}{2}$ square miles. The FEA is estimating spills at 30 times the size of what the federal government considers a major spill. If it does happen, the damage would be devastating. And these figures do not anticipate any major accident. Attached are duplicates of the spill estimates made by L.S.U. in connection with the Loop Project designed to only store 60 million barrels, which indicate chronic minor spills there in excess of 1,752 barrels per year with major spills in the range of 40,000 to 60,000 tons per year. See attached pages 98 through 101 from Superport Studies, Vol. 4., Appendix "E"

The FEA says it will build levees to contain the spills. But construction of such structures in the soft Wetlands is very difficult. The slow moving tides of the area would spread oil throughout thousands of acres of bayous, swamps and marshes. The languid water never creates enough agitation to cleanse itself. The detergent used to clean up the mess is as deadly as the oil, or brine itself.

Remember, when the oil is needed, 3,333,333 barrels a day will be pumped in and out. When you are moving 500,000,000 barrels of oil in 150 days, it only takes accidental dribblings totaling .001% to create an oil spill the size of the Santa Barbara disaster. If a major spill were to occur, over reaction to the disaster could cause Congress to pass such stringent controls over oil transportation and storage that the petro-chemical industry would be strangled.

Brine.—7.2 gallons of brine are created for each gallon of oil that goes into the salt dome cavern. (See Appendix "A") Brine has five times as much salt as sea water and is more deadly to the eco-system than the oil.

Part of the brine will be stored in open ponds for use when the cavern is emptied and part must be disposed. The FEA proposes injecting it into aquifers. (This brine will contain oily residue as well as concentrated salt.) They are not sure how the resulting increase in water pressure will affect the fresh water supply.

In the case of Bayou Choctaw, the brine would be injected into an aquifer at 5,000 feet which may affect Baton Rouge's water at 2,500 feet.

Bayou Choctaw is surrounded by approximately 30 old oil and gas wells, some of which are plugged and some of which are not. Increased pressure in the 5,000 feet sand could push the brine into these wells where it will rise easily to the surface, contaminating the drinking water as it does so.

Brine spills are estimated at .002% by the FEA. They translate that as a possible 1,000 barrels. But we believe at least 3.6 billion barrels of brine will be created in the operation, making an anticipated brine spill of 72,000 barrels per year. What happens when a hurricane hits an open brine pit containing 500,000 barrels of brine as proposed at Bayou Choctaw? (Appendix "F")

There are no effective recovery methods for brine. It is estimated that 75% of all Gulf Coast shrimp spawn in the brackish waters of the Louisiana marshes. They cannot reproduce in sea water nor in fresh water. They must have the delicate balance of the two that occurs only in Louisiana marshes.

Collapse of the Dome.—The FEA ignores the fact that domes Do Collapse. On page 1-17 of the Bayou Choctaw report (see Appendix "F") a large "lake" is clearly marked.

At one time this "lake" was Salt Dome Cavern #7. Dr. Craven's representative at the LSU Seminar said the lake is 85 feet deep and "seems to be slightly saline for some reason".

Numerous other domes have collapsed, but the industry has kept its failures quiet, as at Sorrento. Minimal damage has resulted because the substance stored—propane and butane—either dissipated in a gaseous form or burned cleanly and quickly.

Dr. Hardy of Penn State said at the LSU Dome Seminar that digging a hole in salt puts a new set of stresses on the salt rock—which is unpredictable in the best of circumstances—and that changing the pressure inside the cavern (i.e. filling, emptying and washing) adds a third and further complicating stress on the whole structure.

To determine the stability of any salt dome, Dr. Hardy claims, one must know the pre-existing stress pattern, the geometry of the hole inside and the physical properties of the salt rock. Currently none of the three has been measured, at any site.

The South Louisiana domes are the most inherently unstable because of their relative youth. According to Dr. Robert Thomas of the Engineering Science Department at LSU, "In the North Louisiana domes we have a better chance of getting stability. Salt domes are formed by the pressures of sediment building up. At this time the edge of the Gulf Coast is moving as sedimentation continues".

FEASIBILITY OF ACQUISITION

It is our understanding that this is a moot point since the government plans to to condemn what ever property it wants, from the rightful owners.

COSTS

FEA claim: \$300,000,000 has been allocated for the initial stage of the ERS for FY 1976.

\$500,000,000 has been allocated for FY 1977 for the purchase of the crude oil.

Answer: Our proposals for using northern Texas, Louisiana and Mississippi domes or northeast U.S. salt beds does not appreciably increase the cost of the project. Money which the FEA plans to spend on confiscating partially developed properties, which will cost more any way, could go to designing previously unused domes specifically for this project. (Appendix "I")

The FEA is not looking at the cost of the damage to the unique eco-system of the Gulf Coast Wetlands: the fisheries which supply a significant portion of the nation's seafood and fish, the estuaries which are the spawning grounds and house endangered species and other unique Wetlands inhabitants, could be destroyed. The priceless recreational qualities of the area, hunting, fishing and boating could be greatly harmed. See the locations of Sabine, Paul Rainey and Russell Sage refuges in relation to the proposed sites. (Appendix "D")

No compromise: We prefer that the oil be stored on dry land. But we recognize the need for immediate storage for the first phase of the program. We believe the government should work with private industry to provide the necessary initial emergency storage.

The government should not take over the oil storage business just to complete this short-term, stop gap project. To compromise on the first 150,000,000 barrels will allow the FEA to do exactly what its officials have said they will do, place the remaining 850,000,000 barrels in the same place.

CONCLUSIONS

One of the most productive eco-chains in the world is threatened by the unresponsive bureaucracy. No one in the FEA is looking at the long range over all effect of the ESR.

We need your help.

Now.

Congress takes a closer look at the plan on December 15. We want to remind our elected officials that the people have a voice in government.

We want public hearings, an opportunity for the people touched by the project to state their opinion; for experienced industry spokesmen to contribute their knowledge to this here-to-fore inconceivable project.

We want the FEA to objectively investigate other sites, to slow down long enough to see the long range effect of what they plan.

We do not object to the storage of crude oil in salt domes. The theory is sound. But in their haste, the FEA is looking at only one tiny piece of a vast puzzle. . . . if they force the wrong shape in, the whole picture can crumble.

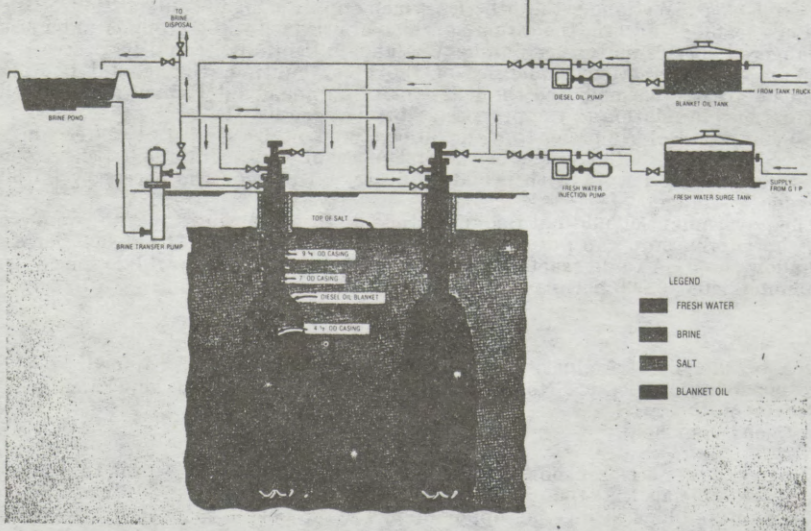
Please contact your representatives in Washington and alert them.

Read the Strategic Petroleum Reserve Draft Environmental Impact Statement for Bayou Choctaw Salt Dome (DES 76-5, FEA/S-76/346) or any of the other sites.

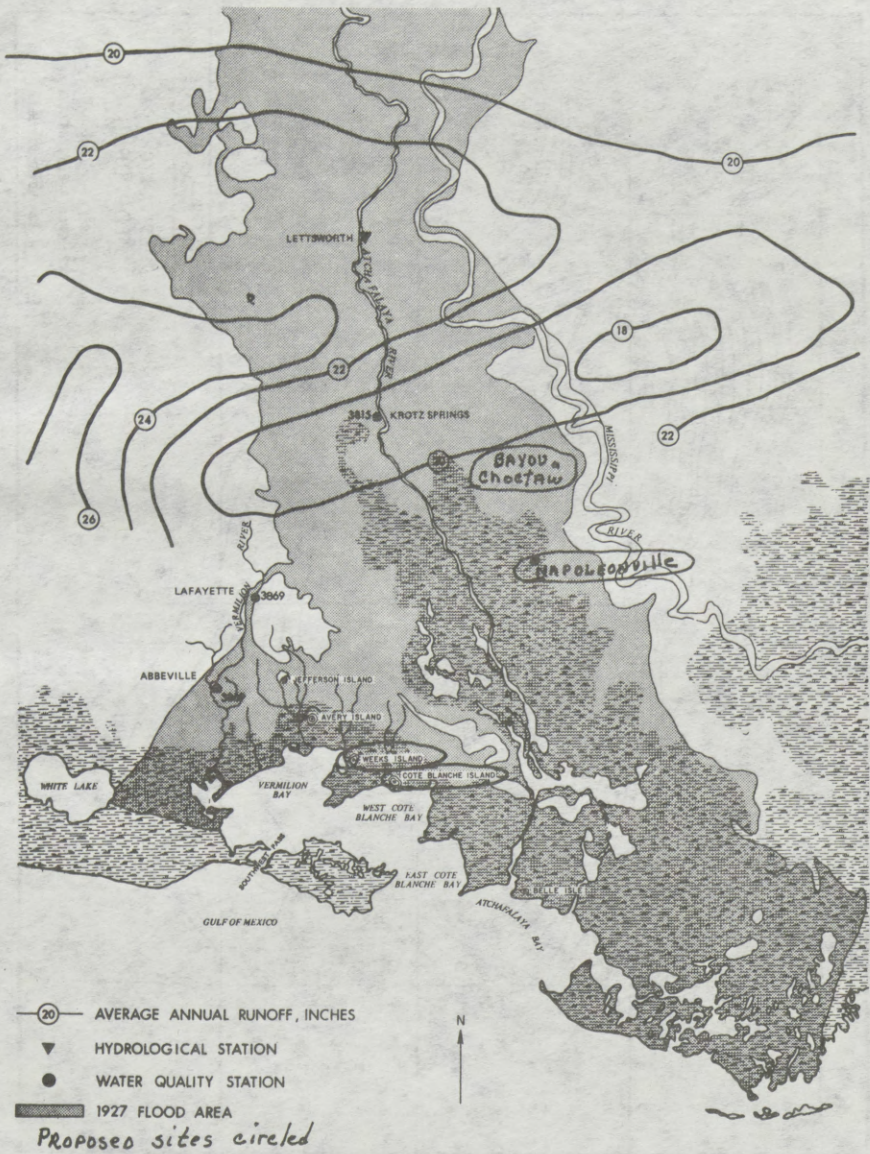
Note that even when the FEA identifies an environmental danger, it discounts the impact it might have.

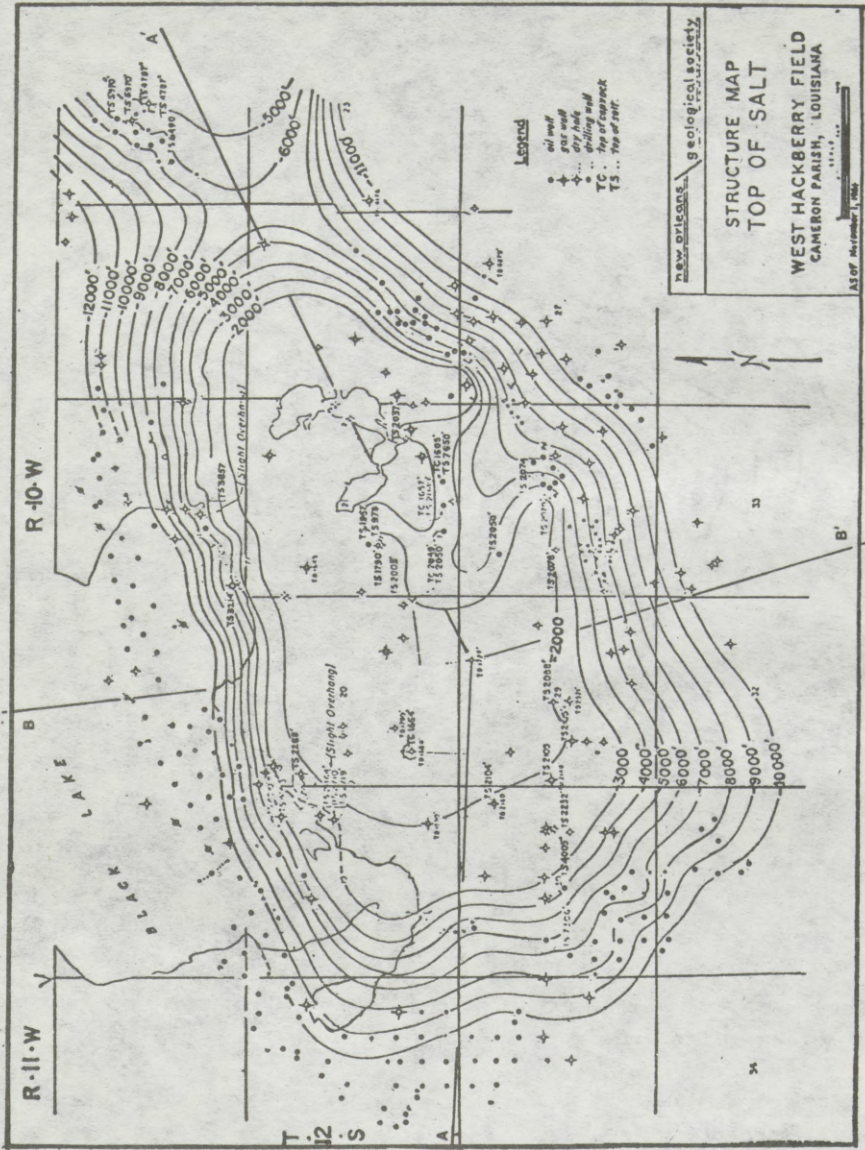
Please, help us rescue the wetlands.

APPENDIX "A"

Creation of a Solution Cavern in a Salt Dome

APPENDIX "B"





Draft EIS W. Hackberry
FEA/S-76/345

FIGURE 2.1.—Structure Map—West Hackberry Field.

APPENDIX "D"

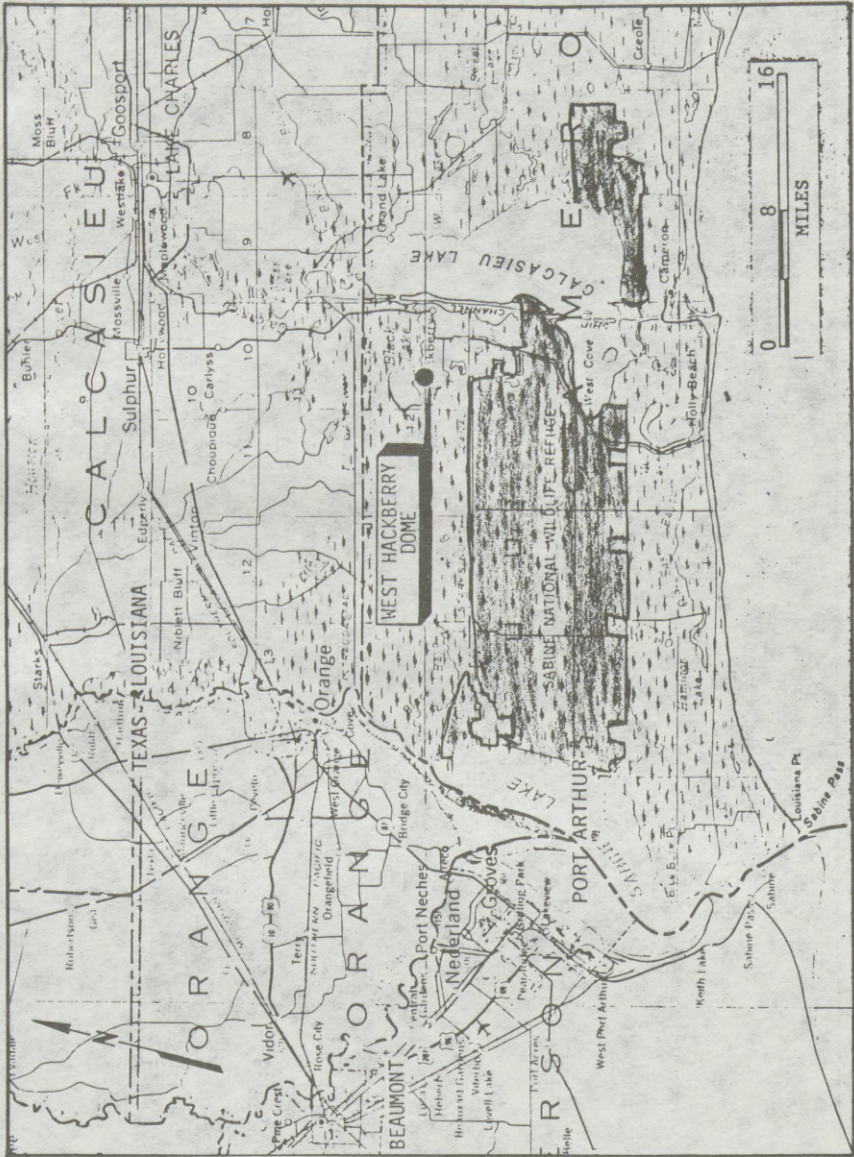


FIGURE 1.3.—Location Map—West Hackberry Dome.

Location of Proposed Crude Oil Storage in Relation to Sabine Wildlife Refuge area. (Draft EIS West Hackberry Salt Dome DES 76-4)
 Sept., 1976—FEA/S-76/34S

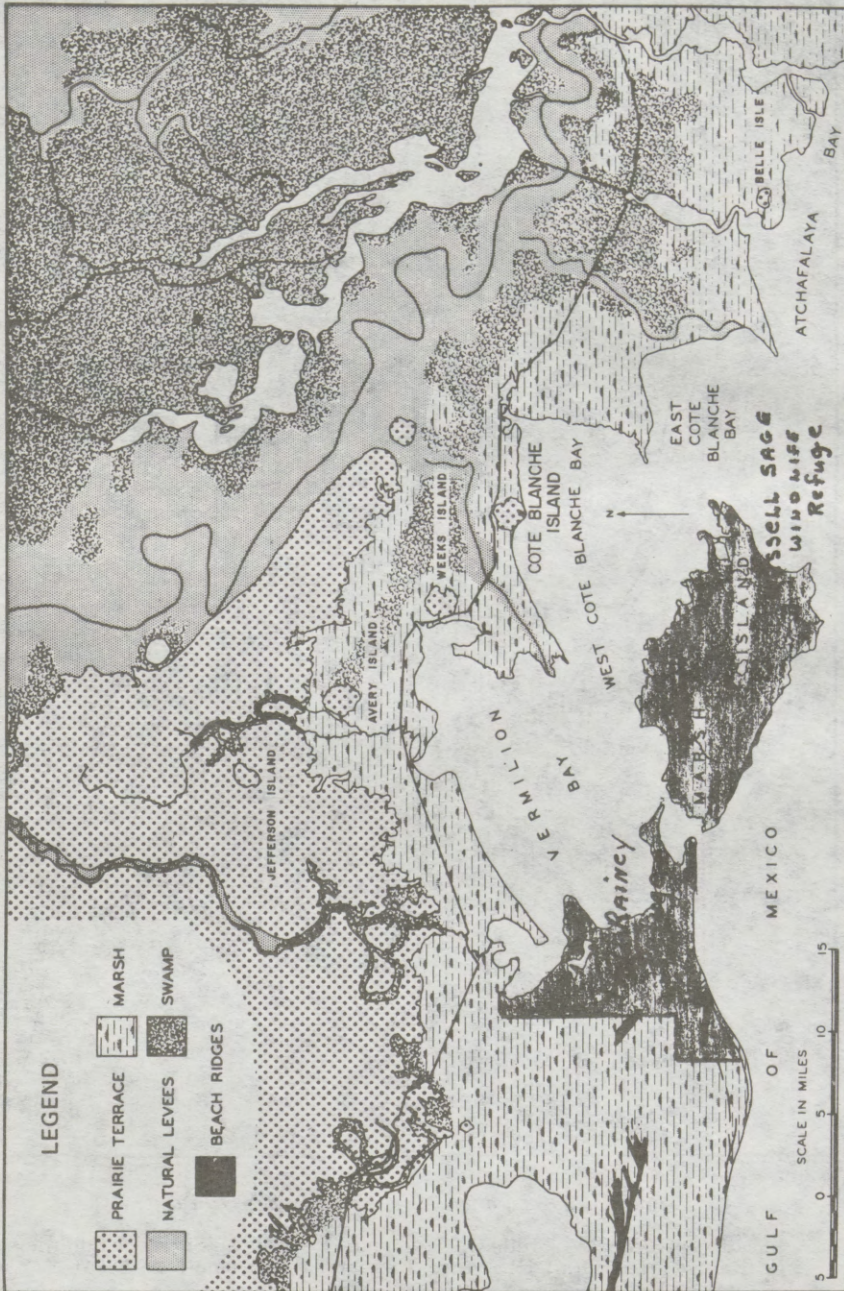


FIGURE 3.2-1.—Physiographic map of central coastal Louisiana.
(Modified from Van Lopik, 1955.)

Location of Weeks Island and Cote Blanche in relation to
Wildlife Refuge Areas (Draft EIS—Cote Blanche)
(FEA/S-76/348)

APPENDIX "E"

LOUISIANA SUPERPORT STUDIES—REPORT 4—CENTER FOR WETLANDS RESOURCES
LOUISIANA STATE UNIVERSITY

B. LAND AREAS IMPAIRED BY OPERATION

1. *Minor Spills—Onshore Pipeline*

Estimation has been made on the basis that there would be an expected spill of 1.2 barrels per day as a result of operation activities of the onshore pipeline. We use 1.2 barrels a day because it represents the minimum quantity for which data have been accumulated (Ichiye, 1972). Such a spill on a persistent basis would probably cause 100 percent impairment of approximately 49 acres of land throughout the life of the project and possibly for some years afterward. Spill size would be affected differently by marsh grasses and open waters, but no estimates exist on this point.

2. *Minor Spills—Offshore Pipeline*

Persistent spills of approximately 1.2 barrels per day as a result of operation of the offshore pipeline would tend to cause similar impairment of offshore submerged land. A similar figure of 49 acres is used in the estimation, again assuming 100 percent impairment for at least the life of the project. Areas that are persistently affected by oil spills generally do not support much life except perhaps microbes (see Crow, 1971 and 1974; and Cowell, 1971).

3. *Minor Spills—Onshore Terminal and Offshore Terminal*

Persistent minor spills of 1.2 barrels per day are used as the primary estimate for environmental damages from the operation of the two terminals. Again, these low-level but regular spills are assumed to effect 100 percent impairment of about 49 acres of land each, and impairment is expected to last beyond the life of the project.

4. *Minor Spills—Berths and Anchorages*

Minor, or chronic, spills from the operation of the offshore terminal's berths and from anchorages are each estimated at the low level of 1.2 barrels per day. Such levels of persistent spills would impair 2253 acres of submerged land for each type of operation, and for each the impairment would be 100 percent for longer than the life of the project.

5. *Major Spills—Onshore*

Major spills are more likely to be at irregular intervals than minor, persistent spills. Therefore, for purposes of estimation, expected annual quantities are used. The expected annual quantity of such spills during the operation of Superport are about 500 tons per year, which would cause 100 percent impairment of approximately 12,103 acres of land. Expected recovery rates would be 50 percent the first year, 75 percent the second year, and 100 percent the third year. We have used the estimate of a 500-ton spill each year on the basis of the recommendations from the Council of Environmental Quality (CEQ) for a previous study (Stone, 1972). Their estimates were based on the advice of the Coast Guard. The estimate of affected acreage is taken from Ichiye (1972). Recovery rates are arbitrarily set as no data could be located on them.

6. *Major Spills—Offshore*

Major spills offshore are estimated to be on the order of 500 tons per year. For purposes of evaluation these are considered to affect 100 percent impairment of 12,103 acres of land, with 50 percent recovery the first year, 75 percent recovery the second year, and 100 percent recovery in the third year. Data for these estimates are as stated above.

7. *Major Spills Not an Annual Expectation*

For spills of a greater magnitude than those expected on an annual basis, it will be necessary to evaluate environmental damages on a probability basis.

Under the assumption that a major spill of 30,000 tons would occur once in 20 years offshore, and once in 20 years onshore, and that each spill would effect 100 percent impairment of 32,357 acres of land, with recovery rates of 20 percent first year, and 40 percent second year, 60 percent third year, 80 percent fourth year, and 100 percent fifth year, an expected annual cost can be computed for such spills. These data estimates are based on sources listed above.

Although the rationale for computing such costs on an annual basis is relatively simple, the calculations are a bit more involved. The technique is demonstrated in Table 4. Examination of the table will indicate that each of the twenty years is assumed to have an equal probability of being the year in which the spill occurs. Since 20 percent recovery occurs within the first year of the spill, each year has an expected damage probability of four percent ($80\%/20$) times the acres impaired times the damages per acre (based on 100 percent impairment). Each year (except the first) has $1/20$ chance of sustaining second year damages which are 60 percent impairment; thus each of the years (except the first) has an additional expected damage probability of three percent ($60\%/20$) which is additive. Each year (except the first and second) has an additional expected damage probability of two percent ($40\%/20$), also additive. Each year (except the first three) has an additional expected damage probability of one percent ($20\%/20$), so that each year from the fourth to the twentieth has a cumulative expected damage probability of 10 percent ($4\% + 3\% + 2\% + 1\%$). Discounting these sums back to present value and summing yields the expected total present cost of the major spill occurring once in 20 years. The process is duplicated for the onshore and offshore spills.

V. PER ACRE ASSESSMENTS

Having decided upon how many acres of land would be affected by the construction and operation of a Superport, the next task is to examine the per acre assessments to be used in the calculations.

A. LAND

Since any land purchased outright by Superport represents an internalized cost, no attempt has been made to assess a per acre charge for land used by the project. However, any land impaired by the project which was previously available to the public represents a cost of the project. Since most of this value would be in the form of recreation, it is treated separately as recreational impairment. Other values of land accrue to society as a whole (such as marshland's value as part of the food chain; see Gosselink, Odum, and Pope, 1974), and should be evaluated. This can only be done retrospectively after the construction and its possible alteration of water flows have been accomplished. This factor should be inserted into the analysis at a later date.

Should the Superport impair large acreages of land as a result of careless construction activities (such as improper pipeline construction procedures), such charges should be made against the project as they can be evaluated.

APPENDIX "F"

Note proximity of proposed storage well #3 to collapsed cavern #7, now a lake. There have been no studies made as to the structural damage to the dome from the collapse of cavern #7.

Note, also, the streams and waterways adjacent to and through the proposed facilities.

APPENDIX "F"

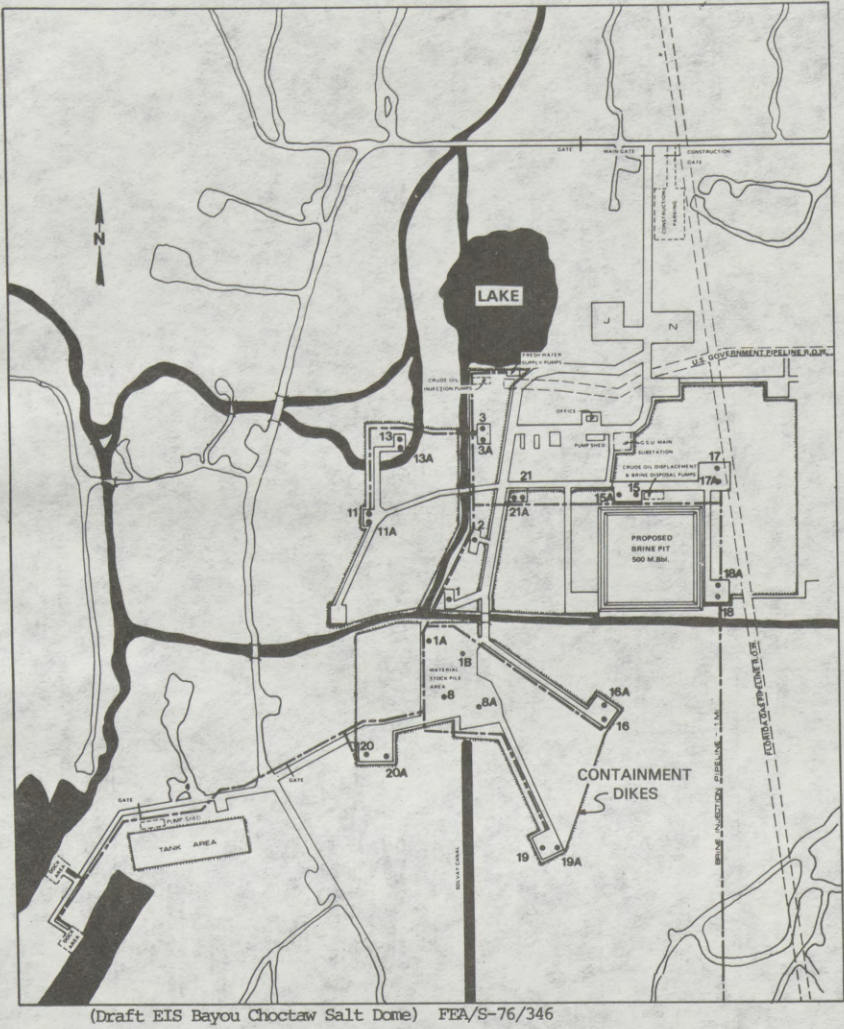


FIGURE 1.7 Proposed Storage Facility

APPENDIX "H"

EIS W. Hackberry [Every proposed site is surrounded by similar vegetation]

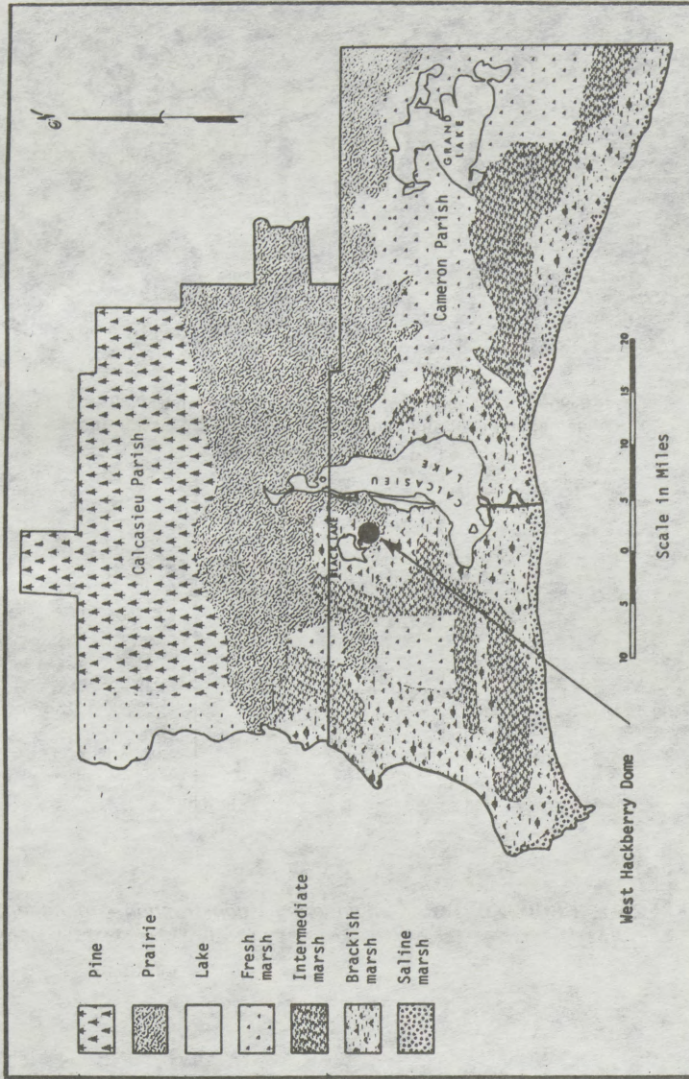
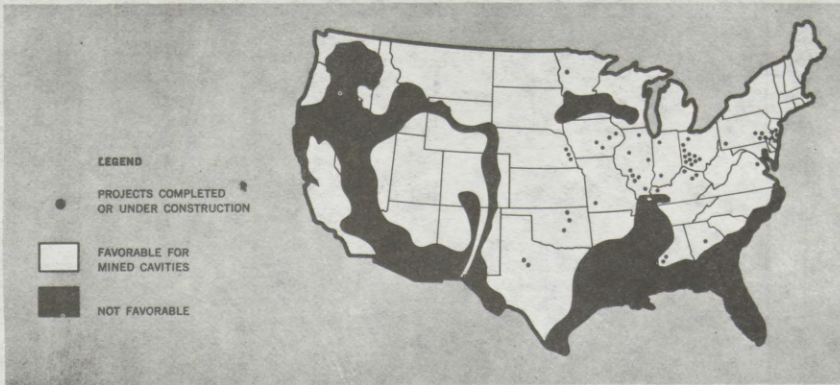


FIGURE 2.29 Distribution of vegetation types in two parish study area of the West Hackberry salt dome.

APPENDIX "I"

Areas Favorable for MINED STORAGE in the United States



OVER 90% of all mined underground storage for L. P. GAS has been engineered and constructed by Fenix & Scisson, Inc.

A list of Fenix & Scisson, Inc. projects.

Client — Location	Capacity Bbls.	Year Completed	Earth Formation	Client — Location	Capacity Bbls.	Year Completed	Earth Formation	Client — Location	Capacity Bbls.	Year Completed	Earth Formation
Baltimore Gas & Electric Co. Baltimore, Md.	150,000	1962	Granite	Metropolitan Utilities District Omaha, Neb.	150,000	1960	Shale	Sunray Oil Company Tulsa, Okla.	250,000	1966	Shale
Cincinnati Gas & Electric Co. Cincinnati, Ohio	200,000	1963	Limestone	Omaha, Neb.	250,000	1963	Limestone	Texas Eastern Transmission Corp. Middletown, Ohio	185,000	1959	Shale
Columbia Hydrocarbon Corporation Siloam, Ky.	210,000	1959	Shale	Norsk-Hydro Herfys, Norway	300,000	1967	Limestone	Middletown, Ohio	275,000	1959	Shale
Continental Oil Company Siloam, Ky.	85,000	1959	Shale	Northern Natural Gas Products Co. Des Moines, Iowa	60,000	1967	Limestone	Middletown, Ohio	160,000	1959	Shale
Conoco Oil Company Ponca City, Okla.	300,000	1961	Limestone	Des Moines, Iowa	180,000	1967	Shale	Middletown, Ohio	130,000	1959	Shale
Griffith, Ind.	300,000	1970	Shale	Service Pipeline Co. Dumright, Okla.	225,000	1964	Shale	Middletown, Ohio	225,000	1960	Shale
Dixie Pipeline Co. Minter, Ga.	325,000	1965	Granite	Shell-Berre Rouen, France	200,000	1966	Chalk	Middletown, Ohio	425,000	1961	Shale
E. I. duPont de Nemours & Co. Gibbstown, N. J.	180,000	1968	Granite	Rouen, France	60,000	1966	Chalk	Oakland City, Ind.	115,000	1961	Shale
Esso Standard Oil Company Linden, N. J.	150,000	1957	Shale	Shell Oil Company Wood River, Ill.	520,000	1960	Limestone	Greensburg, Pa.	100,000	1964	Shale
Linden, N. J.	150,000	1957	Shale	Wood River, Ill.	260,000	1961	Limestone	Mone, Ill.	200,000	1972	Shale
Linden, N. J.	100,000	1958	Shale	Sigal Oil & Gas Co. Erskine, Minn.	300,000	1962	Dolomite	Mone, Ill.	115,000	1972	Shale
Linden, N. J.	125,000	1958	Shale	Sinclair Oil & Gas Company Gomolish, Okla.	110,000	1954	Shale	Greensburg, Pa.	200,000	*	Shale
Linden, N. J.	150,000	1958	Shale	Sinclair Oil & Gas Company & Taloma Gas Products Co. Demopolis, Ala.	140,000	1956	Chalk	Lick Creek, Ill.	200,000	*	Shale
General Facilities, Inc. Wood River, Ill.	100,000	1962	Limestone	Demopolis, Ala.	225,000	1956	Chalk	Taloma Gas Products Co. Wood River, Ill.	240,000	1961	Limestone
Hydrocarbon Transportation, Inc. Des Moines, Iowa	100,000	1970	Shale	The Standard Oil Co. (Ohio) Toledo, Ohio	425,000	1970	Shale	Union Light, Heat & Power Co. Covington, Ky.	175,000	1961	Limestone
Morris, Ill.	150,000	1971	Shale	Lima, Ohio	175,000	1970	Shale	U. S. Industrial Chemicals Co. Tuscola, Ill.	800,000	1964	Limestone and Shale
Laclede Gas Company Florissant, Mo.	785,000	1972	Shale	Sun Oil Company Marcus Hook, Pa.	250,000	1958	Granite	Warren Petroleum Corporation Breckenridge, Texas	20,000	1950	Shale
Masco, Inc. Greenwood, Neb.	400,000	1963	Limestone and Shale	Marcus Hook, Pa.	250,000	1960	Granite	Breckenridge, Texas	30,000	1962	Shale
Iowa City, Iowa	400,000	1963	Shale	Marcus Hook, Pa.	400,000	1961	Granite	Burns, Ill.	50,000	1953	Shale
Iowa City, Iowa	270,000	1967	Shale	Marcus Hook, Pa.	75,000	1962	Granite	Crossville, Ill.	50,000	1953	Shale
Farmington, Ill.	400,000	1965	Shale					Galbert City, Ky.	275,000	1963	Limestone
								Washington Gas Light Burke, Va.	300,000	1962	Granite
								Williams Brothers Pipeline Co. Carthage, Mo.	220,000	1967	Shale

*Under Construction

FS



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APPENDIX "J"

Who are we and why are we writing you about oil storage in the Louisiana Wetlands? We are a group of concerned citizens, some in the gas and oil business, who fear for the very survival of the Wetlands—a unique eco-system found nowhere else in the country.

We are horrified at the non-action of the federal agencies charged with protecting our environment (i.e. EPA).

We are appalled at the exclusion of State and local governments, industry and private citizens, from a decision making process which directly affects them.

Many mistakenly think of the Wetlands as "worthless" swamps, when in fact they are teeming with life. Shrimp, crayfish, feeder fish for large fish caught on the Gulf Coast, all breed in the Wetlands. Duck hunters know the richness of the area. Bird watchers know its uniqueness. Botanists and biologists know that only the Everglades offers anything comparable.

People respect its quiet beauty.

This project, ESR, could severely cripple the Wetlands. We don't want that to happen.

Please help us rescue the Wetlands, before it is too late. Remember, where plants cannot live man cannot survive; as the Bible says, "all flesh is grass."

Mr. DINGELL. In order to have this matter fully exposed to the committee, the Chair will ask the staff to direct this to FEA for response.

Mr. COLE. Thank you, sir.

Mr. DINGELL. Mr. Kamlet.

STATEMENT OF KENNETH S. KAMLET

Mr. KAMLET. Mr. Chairman, my name is Kenneth S. Kamlet. I appear here today on behalf of the National Wildlife Federation to register our strong concern about the Ford administration's proposal to locate the bulk of the strategic petroleum reserve in the heart of the Nation's largest, most productive and most fragile ecosystem, the Louisiana and Texas coastal zone.

First, I would like to thank the committee for providing this opportunity to us to present these views.

With the Chair's permission, I will summarize my prepared remarks.

We will limit ourselves today to one significant consequence of the FEA's plan to relocate half a billion barrels, namely, the inevitable spillage of substantial amounts of it. If the historical spillage rate for oil tankers holds true for this undertaking—and there is reason to expect an even bigger spillage rate—at least 160,000 barrels of oil will be spilled.

This quantity of oil represents nearly ten times the size of the catastrophic Santa Barbara spill and is more than three times the total Gulf of Mexico OCS oil spillage recorded during the 4-year period 1971-75.

FEA tells us not to worry. They talk about environmental protection plans and oil spill contingency procedures, not yet developed, by the way, which they say will "minimize the amount of oil spilled and control impacts on sensitive environmental areas."

We know just how effective such measures were in the *Argo Merchant* case and in the several oilspill incidents that followed.

What really worries us, though, is the place chosen by the previous administration to locate and concentrate all of this oil handling activity and, therefore, much of the risk of oilspills.

It is, or should be, common knowledge that the wetlands of this country are in trouble. Less than half of this country's original wetland

acres remain. About 30 percent of our remaining coastal wetlands are in Louisiana.

So where did FEA choose to store the bulk of our strategic oil reserves? You guessed it. Right smack dab in the midst of Louisiana's coastal wetlands.

On page 2 of my prepared statement we list seven of the many societal and environmental functions performed by wetlands, which make them an irreplaceable national treasure. A single acre of coastal marshland and estuary has an estimated income capitalization value to man of \$82,000 and an ongoing annual life support value of \$4,100.

Let us look at Louisiana. Ninety-eight percent of Louisiana's commercial fishing industry, worth at least \$50 million a year, derives its livelihood from the coastal zone. Coastal sportsfishermen spend at least another \$160 million in the State.

Louisiana's coastal marshes make it the leading fur producing State in the Nation, with an average fur harvest of about \$10 million per year; and because of its coastal marshes, Louisiana winters more waterfowl than any other State, including 8 million ducks and geese and three-quarters of the North American woodcock population.

Numerous rare and endangered species, including our national symbol, the bald eagle, also inhabit the gulf coast region singled out by FEA.

How do oil and wetlands get along? About as well as Arabs and Israelis.

Let me quote from the FEA's programmatic environmental impact statement, chapter V, page 172:

When spilled oil enters a saltmarsh it is very difficult to remove. The oil adheres to plants and does not wash off easily, usually killing the parts exposed to the oil. A film of oil lying over the soil can also slow or prevent gas exchange, and probably decreases the productivity of minute mud algae. These algae are important to the ecosystem.

Pomeroy in 1959 found that they contributed as much as one-third to the annual production of a Georgia salt marsh. Sluggish or nonmobile animals living in the marsh may also become fouled. Shore crabs, such as the mud crabs, fiddler crabs, and blue crabs, which live in shallow burrows, are particularly sensitive not only to direct contamination but also to poisoning through ingesting harmful quantities of oil from oil-fouled food.

The FEA quote continues:

An oil spill in a salt marsh can be particularly damaging if it occurs at a time when the shallow nursery areas contain large numbers of juvenile fish and shellfish which are likely to be fouled directly or succumb to dissolved toxins.

The FEA plan, quoted on page 5 of my prepared statement, points out that some wetlands recover slowly, if at all, from the effects of oilspills; that chronic exposure of animals and plants to petroleum even in small- to medium-quantities is usually very damaging; that wetlands cannot function with a chronic coating of oil; that a high percentage of birds and mammals do not survive contact with oilspills; and that any fish which manage to survive will be unfit for human consumption.

By choosing to store strategic reserve oil beneath the fragile gulf coast wetlands, FEA has done almost everything possible to ensure that when the inevitable spills occur, they will have the greatest possible adverse impact on the environment.

We recognize that the FEA chose the sites it did for reasons other than their proximity to critical coastal wetlands. Whether or not

these other reasons are valid, we believe that the national environmental policy set by Congress more than 7 years ago, and the interests of our Nation in safeguarding all of our natural resources, dictate that the FEA look elsewhere for the establishment of strategic oil reserves.

For these reasons and others, we respectfully recommend that the present administration and the Congress take the time to think through the SPR concept more fully and more carefully.

This can be done without delaying establishment of the Early Storage Reserve called for by the end of next year, by setting aside 150 million barrels of the existing Elk Hills, Calif., naval reserve for this purpose.

Such a step is specifically permitted by section 11(k) of the Naval Petroleum Reserve Act of 1976. We have recommended directly to the President that he utilize his authority under section 11(k) in this manner.

A copy of the Federation's letter of February 14, 1977, to the President has been submitted for inclusion in the hearing record.

We urge this committee and the Congress to support designation of a portion of the Elk Hills reserve to satisfy the first stage of the SPR, to support a resolution disapproving the Ford administration's SPR plan, unless the present administration agrees voluntarily to withdraw it, and to express in any such resolution the intent of Congress that FEA explore alternative locations and methods outside the gulf coast wetland ecosystem for meeting longer term SPR objectives.

Oil has its uses and its proper places. Coating the wings of waterfowl and contaminating America's most extensive and valuable wetlands are just not among them.

We ask you to send FEA back to the drawing board.

[Mr. Kamlet's prepared statement, and the letter referred to, follow:]

STATEMENT OF KENNETH S. KAMLET, ON BEHALF OF THE
NATIONAL WILDLIFE FEDERATION

Mr. Chairman, members of the committee, my name is Kenneth S. Kamlet. I am appearing on behalf of the National Wildlife Federation, the nation's largest private conservation education organization. I am an attorney and biologist with the Federation.

We are here to register our strong concern about one key feature of the Federal Energy Administration's Strategic Petroleum Reserve Plan ("SPR"): the proposal to locate most if not all of the 500 million barrel petroleum reserve and its support systems over, under, around, and through one of the world's most important and most ecologically sensitive saltwater wetland ecosystems.

Specifically, of the eight candidate Early Storage Reserve ("ESR") sites, only two—the Ironton Mine in Ohio and the Central Rock mine in Kentucky—lie outside the coastal wetlands of Louisiana and Texas. (SPR Plan, pp. 82-84, App. F). One salt dome (West Hackberry) is two miles north of the Sabine National Wildlife Refuge and two salt mines (Weeks Island and Cote Blanche) are directly across the bay from four national and state wildlife refuges.

The perpetuation of wetlands in their natural state is of direct importance to man, to the people of this country, and to this country's economy for a large number of reasons. They perform all of the following functions at no cost and without depleting our energy resources:

- (1) provide spawning and nursery areas for commercial and sport fish and shellfish;
- (2) provide natural treatment of waterborne and airborne pollutants;
- (3) recharge the groundwater for water supply;
- (4) provide natural protection from floods and storms;
- (5) provide essential nesting and wintering areas for waterfowl;
- (6) constitute a high-yield food source for aquatic animals; and
- (7) provide an important filter system for lakes and streams.

When this country was founded, what are now the lower 48 states contained an estimated 127 million acres of wetlands. Twenty years ago at least 45 million acres of our primitive marshes, swamps, and seasonally flooded bottomlands had been lost to dry land uses through clearing, drainage, and flood control. Within the last 20 years, an additional 6 million acres have been lost.

Although estimates vary as to the proportion of original wetland acres remaining, some authorities believe that more than half of this irreplaceable national treasure has already been lost.

Louisiana is the custodian of approximately 30 percent of the nation's existing coastal wetlands. These wetlands produce 25 percent of the commercial fisheries in the United States. In Louisiana commercial fishing is a \$50 million a year industry; 98 percent of this business is derived from the coastal zone. In many areas of Louisiana, coastal sport fishing is even more important economically than commercial fishing. Dr. James G. Gosselink of Louisiana State University estimates that at least \$160 million per year is spent for sport fishing in Louisiana.

Coastal wetlands are the nursery grounds for nearly all commercially important offshore fisheries. McHugh (Amer. Fish. Soc. Spec. Public. No. 3, 1966) stated that two-thirds of the cash value of species harvested on the Atlantic and Gulf coasts are estuarine dependent. Others put the degree higher. Recently, Dr. Eugene Turner, also of LSU, has shown that on a worldwide basis there is a direct relationship between the offshore harvest of shrimp and the total area of the salt marsh upon which that fishery is dependent. For each acre of marsh destroyed, one can expect a corresponding reduction in the fishery resource.

Gosselink, Pope, and Odum have estimated the dollar values to society of marsh-estuary acreage by various methods of evaluation. Their conclusion: marshlands and estuaries of the South Atlantic and Gulf Coasts have an income-capitalization value (at interest rate 5%) of \$82,000 per acre, and yield an ongoing annual return of \$4,100 in total life-support value.

One could go on and on. The coastal marshes of Louisiana make it the leading fur producing state in the nation, with an average fur harvest of about \$10 million per year. Louisiana's coastal zone also serves as wintering grounds for over one-half of the waterfowl in the Mississippi Flyway, making it the most important waterfowl habitat within the most important waterfowl migration route in the nation. Some 70 to 80 percent of the North American woodcock population are believed to winter in this state. So do eight million ducks and geese, including a large part of the nation's blue geese and lesser snow geese. Because of its coastal marshes, Louisiana winters more waterfowl than any other state.

Endangered species are also present. According to the FEA's programmatic Final Environmental Impact Statement (p. IV-64), fourteen species of birds thought to be rare, endangered, or of questionable status—including the Southern Bald Eagle, the American Ivory-Billed Woodpecker, and the Whooping Crane—may all occur in the Gulf Coast region singled out by FEA to bear the brunt of oil storage requirements under the SPR plan. In addition to these bird species, the prairie grasslands, marshes and forests of the East Texas and Western Louisiana coasts, including the area of the West Hackberry and Bryan Mound salt domes, represent habitat of an endangered mammal, the red wolf. The SPR plan may also impact six species of rare or endangered amphibians and reptiles, and three species of fish of questionable status.

The coastal wetlands of Texas, although somewhat less extensive, are also of great ecological and commercial value. For example, Texas led the states in the commercial shrimp catch for 1975: \$87.9 million in landed value—nearly 40 percent of the nationwide catch.

What will the FEA's plan mean to the coastal wetlands of Louisiana and Texas? Possibly a great deal—and none of it good.

In the words of the SPR Plan itself (p. 222):

A single oil spill of large magnitude would coat the water surface, plants, birds, and soils, and thereby interfere with oxygen transport and availability. If toxic products and crude were deposited in sediments, the oil could penetrate to a depth of 70 cm and release toxins for several years Some wetlands will recover rapidly, while others recover slowly, if at all. A large spill would have the most severe impacts if it occurred very close to shore in the Gulf of Mexico or in a major estuarine area surrounded by productive wetlands. Chronic exposure of animals and plants to petroleum in small to medium quantities is usually very damaging. Wetlands cannot function with a chronic coating of oil. A high percentage of birds and animals do not survive contact with oil spills. While fish can survive such conditions, they are unfit for human consumption due to the "oily" taste.

Far from discounting the risk of a significant oil spill, FEA fully expects such spills to occur. During the fill phase of the program alone, the SPR Plan contemplates (under "worst-case" assumptions) "about six accidents resulting in spills." (SPR Plan, p. 221). The most likely type of accident associated with the fill phase is predicted to produce a "mean spill size" of approximately 10,000 barrels. (*Id.*). One can assume, if six major spills can occur in connection with a careful, systematic "fill" effort in the absence of rigid time constraints and the pressures of an oil embargo or other national emergency, that a great many more spills would be likely should it become necessary to pump out and distribute 500 million barrels of oil in the space of 150 days during an emergency.

Moving 500 million barrels in 150 days means that $3\frac{1}{3}$ million barrels must be moved each and every day during this period; must be transferred from salt domes to barges, from barges to tankers, from tankers to refineries, from refineries back to tankers (or to pipelines) and then to the East Coast and other destinations. The risk of spillage during this sequence of events seems enormous. According to the Council on Environmental Quality, the historical spillage rate for oil tankers is 0.016 percent. If this rate holds true for the transport of oil to and from the SPR (500 million barrels each way), one could anticipate spills amounting to 160,000 barrels—nearly ten times the size of the Santa Barbara spill (16,700 bbl.), and more than 3 times the total Gulf of Mexico OCS oil spillage (51,421 bbl.) recorded during the four year period 1971–75. This spill estimate does not consider the pressure of an oil emergency, the large number of handling and transfer steps to and from the storage domes, and reliance on barges rather than tankers for part of the transfer sequence—all of which could tend to increase the likelihood of spills.

By choosing to store this oil beneath the fragile Gulf Coast wetlands, FEA has done almost everything possible to ensure that when an oil spill does occur, it will have the greatest possible adverse impact on the environment.

It seems clear that the FEA has proceeded, in developing its SPR plan, on the basis that the "most desirable" oil storage locations are in the Gulf Coast area (SPR Plan, p. 9). Whether or not this assumption is accurate in terms of access to an oil distribution system, it is obviously not accurate from the standpoint of natural resources conservation. As we have seen, the Gulf Coast area is among the *least* desirable locations when viewed in the light of potential impacts on the environment.

How does FEA address these impacts? It asks us—you and me—to put our faith in a so-called "Environmental Protection Plan," to be developed at some future date, which will "ensure" that the planning, design, and construction of the SPR facilities "are conducted in a manner that is environmentally sound" (SPR Plan, p. 2), and in "oil spill contingency procedures," also to be developed at a later date, which will "minimize the amount of oil spilled and . . . control impacts on sensitive environmental areas" (*id.*, p. 222). We should bear in mind, before taking too much comfort in these plans and procedures, the *Argo Merchant* oil spill and the ones which have followed. We have learned how effective efforts were in those cases to contain the spilled oil, minimize the amount of oil spilled, and control the spill impacts.

The FEA assumes that the effects of an oil spill in Gulf Coast wetlands would be reversible within 2 years. (SPR Plan, pp. 202–234; App. F). We are not nearly so sure. Elsewhere, the Plan itself acknowledges (p. 222) that, while some wetlands will recover rapidly, "others recover slowly, if at all."

The SPR Plan, the programmatic Environmental Impact Statement, and all of the site-specific impact statements raise many more questions than they answer. We have dwelt in this testimony only on the risks to the Gulf coast environment of oil spills in the course of oil transfer. We have not dealt with the damage which might result from the subsidence and collapse of a salt dome full of oil or with the impacts of massive construction activities in wetland areas. We have not discussed the environmental impacts of withdrawing large quantities of freshwater from the ground and surface waters for use in salt dome leaching, or the problems attendant on the disposal of enormous quantities of highly saline brine.

From the oil spill standpoint alone, however, we must regard FEA's plan to rely so heavily on wetland storage and transfer of oil as being ill-considered and ill-advised.

What do we recommend instead?

We recommend that the Administration and the Congress take the time to think through the SPR concept more fully and more carefully in light of the nation's overall best interests. In order that the Early Storage Reserve requirements of the Energy Policy and Conservation Act, calling for the storage of 150

million barrels of oil by the end of next year, not be delayed, we have recommended to the President that he utilize his authority under Section 11(k) of the Naval Petroleum Reserves Act of 1976, to allocate 150 million barrels of this reserve as part of the SPR (to be kept in place, for distribution or transfer at a later time, if necessary). As noted in the SPR Plan (p. 74), the Elk Hills, California naval reserve alone has estimated reserves of 1.2 billion barrels. Stevens Zone oil within this reserve meets all of the crude oil specifications required by the SPR, as determined by FEA. (SPR Plan, p. 56). A copy of the Federation's February 14, 1977 letter to the President has been submitted for inclusion in the hearing record.

In order to provide the President sufficient time to consider this recommendation, we urge this Committee and the Congress to support a resolution disapproving the plan—unless the Administration agrees to withdraw it. Specifically, we ask you to support designation of a portion of the Elk Hills reserve to satisfy the first stage of the SPR, and to resolve to require FEA to explore alternative locations and methods outside the Gulf Coastal ecosystem for meeting SPR objectives.

By this action, the Congress would demonstrate to the American people and to the world that this country can grow and prosper and plan for the future without depriving the generations that follow us of the chance to enjoy all of our natural resources.

The National Wildlife Federation fully supports the concept of an assured reserve of needed energy to protect ourselves against future oil embargoes. We do not believe, however, that the people of this country would go along with a scheme which to all appearances consists of no more than transferring oil from one hole in the ground to another, much to the enrichment of the oil industry and its entourage, with you-know-who footing the tab—particularly, where the risks of serious adverse impact to one of the most critical ecosystems in this country are as great as they are.

Oil has its uses and its proper places. Coating the wings of waterfowl and contaminating America's most extensive and valuable wetlands are not among them.

We ask you to send FEA back to the drawing board.

NATIONAL WILDLIFE FEDERATION,
Washington, D.C., February 14, 1977.

THE PRESIDENT,
The White House,
Washington, D.C.

DEAR MR. PRESIDENT: I am writing you to express the National Wildlife Federation's concern over the Federal Energy Administration's ("FEA") plans to create a Strategic Petroleum Reserve ("SPR"), as directed by Congress in the Energy Policy and Conservation Act of 1975 ("EPCA"). Presidential action is needed—prior to February 24, 1977—to permit FEA to develop alternative storage approaches less damaging to the environment and more in accord with the best interests of the nation.

In short, the FEA has proposed to locate the nation's Strategic Petroleum Reserve in the heart of the nation's largest, most productive and most fragile ecosystem—the Louisiana and Texas Coastal Zone. Louisiana's coast alone contains approximately 8,500,000 acres of salt, estuarine and freshwater marsh—more than 25% of the country's total coastal wetlands. Its fish, shellfish, wildlife and recreational values are inestimable. The perpetuation of these resources is a matter of national priority.

The social and environmental impacts of FEA's proposed action are enormous. Six of the plan's eight sites for storage of the Reserve are salt domes and mines on the Louisiana and Texas Gulf. One salt dome is two miles north of the Sabine National Wildlife Refuge and two salt mines are directly across the bay from the Paul J. Rainey and Russell Sage Wildlife Refuges. Storage of the reserve at these sites poses substantial risks. The heavy tanker traffic transferring oil to and from the reserves will increase the threat of oil spills. FEA's Programmatic Environmental Impact Statement indicates a major spill could have an immediate and drastic effect on the Gulf's fish and shellfish industry, which might take many years to recover. If the highly saline brine (produced in preparing the salt domes) is disposed of by injecting it into deep wells, it would contaminate drinking water supplies. If dumped into the Gulf, the brine will destroy all aquatic life with which it comes in contact. The large volumes of water needed to prepare the salt cavities, if taken from rivers and streams, will increase salt water intrusion and seriously impair the growth of important commercial fish and shellfish. If the water is pumped from the ground, the water table could be drastically reduced, threatening

the water supply of the surrounding area and posing the risk of collapse of salt dome cavities, with resultant subsidence and flooding of the affected area. These statements are taken *verbatim* from the FEA impact statement. There are no full answers to these risks. There are however, according to FEA's impact statement, alternative storage locations—in areas with natural resources of far less economic importance and environmental sensitivity.

FEA's present proposal raises major questions about this administration's energy policy. First, we question whether the country's energy interests will be advanced by the FEA plan to pump oil out of one already existing reserve—the Naval Petroleum Reserve—selling that oil, and then purchasing other crude oil for storage in another reserve—the SPR. Second, we question whether locating the 500 million barrel reserve in the Gulf Coast region will adequately meet the needs of other regions which are equally dependent on foreign oil. Third, we question whether adequate attention has been given to the establishment of an industrial reserve, as provided for by the EPCA, which would enable oil refiners and importers to bear part of the burden of maintaining a strategic reserve. Lastly, we question the rejection of alternative locations outside of our coastal wetlands.

I should emphasize that the Federation does not dispute the need to establish a National Reserve. We only question the implementation plan developed by the previous administration—which under the provisions of the EPCA will become law on or about February 24, 1977 unless the President or Congress acts affirmatively to modify it. Prompt action is needed, not only to satisfy the EPCA's February 24 deadline but also to meet the requirement of a 150-million barrel Reserve by December 22, 1978.

The President has the authority to allocate the Naval reserves to the SPR under Section 11(k) of the Naval Petroleum Reserves Act of 1976. We respectfully urge you to designate a portion of one or more of the four Naval Petroleum Reserves as part of the SPR to meet the EPCA's 1978 deadline for an early reserve. This action will give Congress, FEA and yourself an opportunity to re-evaluate FEA's plan and consider less damaging and more effective alternative methods of achieving the EPCA's objectives.

If you conclude that designating a portion of the Naval reserves to meet early SPR requirements is not in the country's best interest, we ask you alternatively to withdraw the current FEA plan—submitted to Congress on December 15, 1976—or to urge Congress to adopt a resolution disapproving the plan.

To assist you and your staff in responding to this request, I append the following background information and documentation:

1. Title II, Part B, of the Energy Policy and Conservation Act of 1975.
2. Section 11(k) of the Naval Petroleum Reserves Act of 1976.
3. Excerpts from FEA's Final Environmental Impact Statement on the Strategic Petroleum Reserve.
4. Excerpts from "A Plea for Sanity," a report prepared by the Petro-Chemical Ecology Committee of Louisiana.
5. "New Threat for Louisiana Wetlands," *Conservation News*, February 1, 1977.

If I or my staff can be of assistance, please do not hesitate to let me know. We appreciate your attention to this matter.

Sincerely,

THOMAS L. KIMBALL,
Executive Vice President.

Enclosures.

Mr. DINGELL. Thank you.

The Chair recognizes counsel for questions.

Mr. DEMAREST. Thank you, Mr. Chairman.

Mr. Kamlet, the first point I would like to address is your suggestion that the naval petroleum reserve in Elk Hills be utilized as an alternative for the storage of 150 million barrels of oil.

What would be the rate at which that oil could be drawn out of storage if left in place in the ground.

Mr. KAMLET. As I understand it, I believe the figure is about 35 million barrels a year.

Mr. DEMAREST. You said on a daily basis about 100,000 barrels?

Mr. KAMLET. I do not recall; something in that neighborhood.

Mr. DEMAREST. 100,000 barrels a day. What kind of insulation does that give us against an embargo?

Mr. KAMLET. The main basis for this recommendation was to find a means of buying some additional time in which to explore more fully the implications of the overall SPR plan. We recognize that should an oil emergency arise within the next year or next 2 years, whether it takes the form of another OPEC embargo or national security emergency or similar such thing, that what we are recommending would not provide very much immediate protection.

Mr. DEMAREST. I do not want to discount your environmental concerns, because I think they are valid; but my concern relates to your statement: "We do not believe the people of this country would go along with a scheme which to all appearances consists of no more than transferring oil from one hole in the ground to another, much to the enrichment of the oil industry and its entourage."

I think there may be reasons for this scheme of "transferring oil from one hole in the ground to another," and that relates to the surge capacity.

To my knowledge, Elk Hills, with a total recoverable reserve of approximately a billion barrels of oil, will at any one time only be capable of producing 360,000 barrels a day.

If that is the case, if we keep all that oil in ground, every drop of it, and we have only a very small drawdown capacity, it is not the absolute volume in storage but the rate of draw down.

According to FEA, if we store half of that amount in a slat dome or other strategic reserve hole in the ground because it is in a cavity, not in rock, we could draw down in excess of 3 million barrels per day or 10 times the rate of storing twice the oil in place. I think that scheme has some logic to it, and I would like you to explain why you discount it so readily.

Mr. KAMLET. We are not necessarily discounting the logic of what you have just described. It seems to us, however, as we look further down the road, timewise, the risk of another oil embargo increases significantly.

Over the next year or the next 2 years, the risk of another oil embargo is relatively small, it seems to me, compared to what it would be within the next 10 years or the next 15 years.

It seems to me, therefore, that deferring implementation at the early stage of the strategic reserve program, which at best would provide for 150 million barrels of reserve capacity of the ultimate 500 million barrels, would present relatively little risk, particularly when weighed against the risk of the environment of taking precipitous or ill-conceived action to put 150 million barrels within the next year or year and a half in the gulf coast's crucial wetland areas.

Mr. DEMAREST. What is now being stored in the facilities which the FEA proposes to utilize?

Mr. COLE. What is now being stored, sir?

Mr. DEMAREST. Yes.

Mr. COLE. The only storage that I know about of the four sites in Louisiana is that there are some LP gasses stored in some of the facility at Bayou Choctaw, and there is some LP gas storage in some of the facility at West Hackberry.

Of course, one of the salt mines is an active dry salt mine. The other one, as I understand it, is inactive at the present time.

Mr. DEMAREST. It seems to me your comments regarding disposal of brine and some of these other questions might be related more appropriately to a long-range construction program aimed at developing substantial new capacity in this area.

Mr. COLE. Perhaps that is correct, but the FEA plan, as it presently exists, tells us that that is exactly what the Agency proposes to do, first to construct additional storage at the same sites as the initial storage; and, second, one must remember that the brining solution mining cavities, for instance, at Bayou Choctaw which Allied Chemical is presently utilizing for the purpose of removing brine to manufacture chlorine, are not great empty voids down in the midst of that thing.

If there is 100 million barrel capacity, there is 100 million barrels of brine in place in that cavern which must be disposed of in order to utilize it for oil. It is coming out when you put oil in it.

Mr. DEMAREST. Somewhat different from the figure referenced, of 7 gallons—

Mr. COLE. That is to create new storage.

Mr. DEMAREST. To focus, if we can, on the early storage program, because Mr. Kamlet raises the suggestion of utilizing Elk Hills instead of taking precipitous action on an early storage program, and I am suggesting that if we do focus on the early storage program, then the arguments respecting 7 gallons to 1 of brine and some of these other concerns about new construction are not really applicable to the immediate question of storage of the first 150 million barrels of capacity.

Mr. COLE. On the other hand, Mr. Demarest, with all due respect, the suggestion which you make in your question about the capacity of Elk Hills, to get oil out, it is a total, absolute, positive, physical impossibility to remove from Bayou Choctaw dome 1 million barrels a day by barge.

Mr. DEMAREST. I am not suggesting just from that dome.

Mr. COLE. I understand you are not suggesting, but I must focus on that dome since it is the first one; and I do not mean 3 million barrels; I mean 750,000 barrels a day in order to deplete the supply of 100 million barrels—which is proposed for the dome—in 150 days is a physical impossibility to remove by barge.

The environmental impact statement for Bayou Choctaw, which I read again, on the plane on the way up here yesterday, proposes for the immediate future to load and unload that dome by barge, not by pipeline.

I perhaps would not be here today if the story that FEA tells about their proposed facility, for instance, at Bayou Choctaw was the one they proposed to implement. It would involve a tanker dock, surge tank, pipelines to the dome, and that domes would be loaded with 100 million barrels of crude by pipeline, and it could come out by pipeline to the cap line at the St. James Terminal or back into tankers for transportation to the east coast. Such is simply not the case. They cannot possibly build that and start loading that dome.

Mr. DEMAREST. Nevertheless, that is what their plan proposes, does it not?

Mr. COLE. Their plan admits, before you get through with it, that they propose to load that dome by barge, and their plan for

Weeks Island and Cote Blanche does not even contemplate the construction of a pipeline at any time.

I think we are getting very far afield from where we started out, and where we started out was trying to focus on Mr. Kamlet's suggestion that this was a scheme for the enrichment of the oil industry to poke one hole in the ground and suck the oil out and put it in another hole in the ground, and that there was some grave ecological damage that could result from the early storage program.

What I have been trying to do is focus on whether the concerns that have been raised in the context of suggesting the solution is not to go forward with the early storage plan, instead to dedicate 150 million barrels to Elk Hills and leave it in the ground, with the ecological concerns that have been raised, are really related to that early storage program or, more appropriately, to the long-range question of storage of substantial quantities of oil in the gulf coast.

I think they are separable, are they not?

Mr. KAMLET. I would like to comment on that, if I may. I think, with respect to the oilspill danger that I spoke to in my testimony, that the early storage component which makes up between one-third and one-quarter of the ultimate storage capacity for the total strategic reserves—

Mr. DINGELL. 150 out of a billion—

Mr. KAMLET. 150 out of 500 million as proposed in the FEA plan. The risk of oilspills, it seems to us, makes up at least as great a proportion. That is, at least one-third to one-quarter the risk proposed by the overall ultimate SPR program. I say "at least" because of the barge component and the early experience that needs to be gained, that would be available to fall back on in the later stages, perhaps, that is not available in the early stages.

Mr. DEMAREST. Could I turn to a different question, and that is of transportation, since we have gotten into this barge issue. Mr. Cole, in your statement you address the transportation question.

Mr. COLE. Yes.

Mr. DEMAREST. You suggest 60 tankers of the size of the *Argo Merchant* would be required to move the oil proposed for the Bayou Choctaw.

Mr. COLE. Yes.

Mr. DEMAREST. That is, if you moved it all at once; is it not?

Mr. COLE. Whether you use one tank 60 times or 60 different tankers, the point I was after, 60 loads of oil of the size that was reported in the press to be contained on the *Argo Merchant*, some 7 million gallons.

Mr. DEMAREST. The target goal of this strategic reserve program is to insulate our economy from as much as a 50 percent import supply interruption for a period of up to 6 months.

To drain that facility over that 6-month period would require 60 tanker loadings of the size of the *Argo Merchant*; is that correct?

Mr. COLE. If my arithmetic is correct and if the 7 million gallons reported in the press is correct for what the *Argo Merchant* was carrying; yes, sir.

Mr. DEMAREST. That is one tanker every 3 days.

Mr. COLE. That is correct.

Mr. DEMAREST. That does not seem to strike me as the kind of congestion that the language in your statement suggests is going to result from 60 tankers cramming in there at the same time.

Mr. COLE. Let me say that I dictated the statement very hurriedly on Monday afternoon and did not even read it myself until yesterday morning. If it leaves that impression, that I am trying to indicate 60 tankers crammed into the Mississippi River on the same day, I do not. But the point I was trying to make is that the plan does not call for emptying the early storage reserve in 6 months. It calls for 160 days.

Mr. DINGELL. So that would still be one tanker for every $1\frac{1}{2}$ or $2\frac{3}{4}$ days?

Mr. COLE. Correct.

Mr. DINGELL. The *Argo Merchant* was not a large tanker; it was a relatively small tanker?

Mr. COLE. I understand.

Mr. DINGELL. As a matter of fact, I am not sure how it would compare with the size barge used along the Mississippi. In my understanding of the size of some of the barges that are used, it is rather small.

Mr. COLE. The largest barges I know anything about are 20,000 barrels.

Mr. DINGELL. I have seen some seagoing barges that look larger than that.

Mr. COLE. I am talking inland barges, and that number is the same number that is picked up in the final environmental impact statement of the FEA. They indicate the barges that would be utilized. Bear in mind, too, Mr. Chairman, these barges have to pass through the Port Allen lock from the Mississippi River into the Indian Village cutoff canal, which is referred to in the final environmental impact statement as the Port Allen Canal. It is a short-cut canal which was constructed by the U.S. Army Corps of Engineers as a short-cut for southbound barges going to Texas to pick up the intercoastal waterway, and the lock capacity there will be stretched to handle a 20,000 barrel barge. That is the way it will have to move to this site from an off-loaded site that is not disclosed to us by the environmental impact statement in the Mississippi River.

But the plan finally says for Bayou Choctaw that they propose to offload seagoing tankers in the Mississippi River to an undisclosed site on shore, then to load into barges, which will then pass through the Port Allen lock, travel downstream in the canal, turn back to the east into what is known as Bull Bay, and there tie up to a barge docking facility and be offloaded there into the storage facility.

They do indicate that at some point in time they intend to construct some pipelines, but I know a little something about dock and pipeline constructions. In December 1978, if they get the pipelines and the docks constructed by December 1978, when they propose to have Bayou Choctaw full, somebody would, as the Frenchman in south Louisiana say, "have to pass a miracle."

Mr. DEMAREST. Your statement raises this question of three-fourth of the total petroleum to be stored in Louisiana funneling into the Mississippi River which serves as the only outlet to the gulf for both New Orleans and Baton Rouge.

Mr. COLE. That is correct, sir.

Mr. DEMAREST. The implication from that is that this incremental shipping will somehow add to the congestion of the Mississippi River.

Mr. COLE. Unquestionably it will.

Mr. DEMAREST. Is that true with respect to the kind of shipping you would experience during an embargo if we have a normal—

Mr. COLE. You are not loading these domes during an embargo; you are loading them now.

Mr. DEMAREST. That is right. The question is not how fast you load. I do not think your concern is particularly about loading because we are not going to load these things except over a period of a number of years. I thought your comment was addressed at the drawdown over a very short period of time of 150 days.

Mr. COLE. As the gentleman from Massachusetts said this morning, when he complained about the secrecy of this program, I find myself in a position where it is very difficult for me to answer your question directly because every time I talk to the FEA, I get a different tale on what they propose to do. For instance, in Plaquemine, La., the night before last, when Mr. Noel finally appeared before the Iberville Parish police jury, he indicated to the members of that police jury, which would be the county commissioners in most States, that 60 percent of the crude oil to be stored in the Bayou Choctaw dome would be refined in the Baton Rouge-New Orleans petrochemical refinery complex. The published literature from FEA indicates that substantially more than 40 percent will go either up the cap line to the upper Middle West or back into tankers to be transhipped to the east coast.

So it is very difficult for me to come to grips with how much more congestion there will be.

My point is that the second largest port, and bear in mind that in addition to the importation and exportation of crude oil from New Orleans and Baton Rouge that New Orleans is the largest grain exporting port in the United States, and Baton Rouge ranks very high, much higher than the seventh that it ranks overall.

Both barge and steamship traffic is very heavy in the lower Mississippi River.

Mr. DEMAREST. Would you try, if you could, to provide to the committee for the record, evaluation of what, in incremental terms, the traffic would be occasioned by drawing down this reserve in the 150 to 180-day time period that we are discussing, would represent in terms of normal Mississippi River barge and ship traffic, how much additional traffic that is likely to provide.

Mr. COLE. I am not sure that I can. I certainly shall endeavor to do so, and I will make every effort to do so. But one of the things which gives me great pause about the environmental impact statement, say, of Bayou Choctaw, is that the traffic figures utilized in that environmental impact statement use datum for the entire gulf coast for tanker ship travel and for the entire western segment of the intercoastal waterway rather than tanker traffic and its accident rates up and down the Mississippi River and barge traffic and its accidents up and down the Mississippi River.

Whether that omission is due to the fact the numbers are simply not available or not kept in that fashion or whether it was deliberate, I do not know. But I will make every effort to obtain the information

from both the Coast Guard and the New Orleans district of the Corps of Engineers and provide them to the committee.

Mr. DAMAREST. Finally, I do notice in your statement that you do indicate that in addition to representing the Petrochemical Ecology Committee of Louisiana, that as a lawyer you also represent the R. D. Phillips family. I wondered, could you tell me, in your statement you discuss alternative sites and the fact that a number of sites that may be more environmentally sound are located in a band of salt domes lying north of the coast which can be seen by reference to plate 181 of the National Atlas published by the Department of the Interior would the R. D. Phillips family control any of those second band of salt domes?

Mr. COLE. In north Louisiana and in northeast Texas, no. They do have an interest in two sites in south central Mississippi.

Mr. DAMAREST. Would they be part of this second band?

Mr. COLE. They would be part of the extreme southern end. However, they are not particularly well located as regards the vicinity of the cap line which seems to be one of the principal criteria that there are other domes which are located close to cap line and Texhoma, the two crude pipelines that FEA wishes to get close to which would be far better located than anything the Phillips family has any interest in whatsoever. I included that statement at the beginning of the statement because Mr. Noel of the FEA has raised that question in the press at home because of my opposition. I want to make it abundantly clear that I am not here in some attempt to blackmail or coerce the FEA into dealing with me in any way at all, though admittedly when we first learned of the program, we did come here, and Congressman Gillis Long's office, who is an old friend of mine, made me an appointment with representatives of the FEA to find out about the program to see if there was some way in which we could participate in the program.

It was obvious when we looked at it that we could not, and we have made no further effort to participate in the program other than to view with considerable alarm the plan as it has come along.

Mr. DAMAREST. Thank you very much.

Mr. COLE. Thank you, sir. Thank you for allowing me to appear. There is, Mr. Chairman, one other thing that might be helpful to the committee. I brought it with me. It is the January-February issue of the Louisiana Conservationist. That is the official publication of the Louisiana Department of Wildlife and Fisheries. It is particularly appropriate, if for no other reason, than an article which appears on the back of the last page, the 30th page, which deals directly with the site of the proposed West Hackberry facility, and it indicates that over 850,000 sacks of harvestable oysters will be available to be gathered in Calcasieu Lake this year at \$250 a sack. That comes to some \$2,125,000 and it goes on to show that Calcasieu Lake has come back from an all-time low of zero sacks of oysters in 1965. The spoil banks created by the dredging cut off the flow of water, circulation of water within that large lake and oyster production went to nothing. Wave action has now broken those spoil banks on the side of the channel down and water is circulating normally.

The economy of that area has rejuvenated to the tune of about \$2 million a year from oyster fishing alone. This is one of the sites that is proposed. If it were developed properly, it is one of the sites

which could be, in my opinion, developed in a reasonable fashion which would run less risks to the environment than some of the other sites.

Quite frankly, I can see the separability that Mr. Demarest is talking about if the first phase is done properly. The two middle salt line prospects, however—I am completely baffled.

Mr. DINGELL. Which ones are you referring to?

Mr. COLE. Cote Blanche Island and Weeks Island. They are not even close, not even close to one of these interstate oil pipelines. The only way you can get to either one of them is by barge down the inter-coastal waterway, and miles and miles of barging, not just a short barge trip such as at Bayou Choctaw. And they go across the inter-coastal waterway and at that point it goes across just miles and miles of the most productive fresh, brackish, and salt marsh in the world. It is just a risk that I do not see how we can afford to take.

Mr. DINGELL. I have a couple comments I would like to add, gentlemen, so that you will be aware of my personal views. The function of this hearing is to gather information and to find out how the program is moving forward to see whether or not anything can be approved, and to see whether or not the necessary safeguards are in place.

I think your comments are particularly valuable and that they are well received by the committee. We want to find out what your views and concerns are. I hope you will not be offended by any of the questions that are raised.

Mr. COLE. No, sir.

Mr. DINGELL. I want it to be very clear you are witnesses before the committee, the committee is grateful to you for your assistance. Since we are evaluating this topic, we must have your views as well as anyone else's. We will give very careful consideration to the question of environmental values in connection with this. That is the reason why I serve as chairman of this subcommittee.

Gentlemen, we thank you both. We are grateful to you for your assistance.

Mr. COLE. Thank you for allowing us to be here.

Mr. DINGELL. We will see your comments are very carefully reviewed by the Federal Energy Agency. Thank you, Mr. Cole, and also Mr. Kamlet.

[The following letter and attachment was received for the record:]

PORT ALLEN, LA., February 23, 1977.

Mr. W. E. WILLIAMSON,
Clerk, U.S. House of Representatives, Committee on Interstate and Foreign Commerce,
Rayburn House Office Building, Washington, D.C.

Dear Sir: Thank you again for allowing me to appear before your subcommittee. After returning to Louisiana and having the time to consider the request for information made by Mr. Demarest, it occurs to me that the traffic information for both barge and tanker on the lower Mississippi River should be available from the F.E.A. writing contractor, however, I will attempt to duplicate that information from the various government sources, i.e. Coast Guard, Corps of Engineers, U.S.A., New Orleans District and the port authorities of New Orleans and Baton Rouge, Louisiana.

It would be well to point out the following problems with the plan as presently proposed:

(1) The oil required to make one initial fill of 150 million blbs. of all facilities must be moved, both by tanker and barge, during a time when the present fleets of both are concerned with the movement of approximately 7 million barrels of imported crude oil per day (F.E.A. estimates) and the domestic production of Louisiana.

In order to accomplish this task, one sees that an increase in tanker ship traffic on the lower Mississippi to move 150 million blbs. by December, 1978, will result in an increase of 29 ships per month for 17 months. This assumes that the fill at Bayou Choctaw will start in August of 1977 as Mr. Noel states in the Baton Rouge, Louisiana, State Times newspaper on February 16, 1977, and that the ships average 300,000 blbs. each, a much more realistic figure than F.E.A. uses, considering channel depth and configurations as well as ship availability.

Barge Traffic, even assuming that the requisite number of 20,000 blbs. barges were available, when they are obviously not, would require 7,500 barge trips per month, or 250 per day.

To fill Bayou Choctaw alone with 100 million blbs. would require 167 trips every 24 hours and the single lock at Port Allen cannot begin to handle this volume of traffic.

The patent absurdity of such a scheme should be plain at this point and if an attempt is made to implement such a plan the already high risk of a major spill is compounded many times over. I have included the marine log for Baton Rouge and New Orleans for the weekend of February 19-20, 1977 to give you some idea of the volume of traffic on the river on any given day.

It should be clear to all concerned that the private sector cannot construct new barges to move this oil on a one shot basis and present fleets are largely tailored to move present volumes at the lowest cost per unit ratio.

(2) The second point that should be stressed perhaps above all others is that LOOP, the Louisiana Superport consortium, was granted a Federal license this year to do much the same thing that F.E.A. proposes. That license was the "most restrictive" ever issued for any project because of the environmental concerns of E.P.A. and the Department of Transportation. To require less of F.E.A. than of private enterprise seems to me to be a slap in the face to every citizen of the U.S. but particularly the citizen who has the misfortune to live on the Gulf Coast.

(3) Lastly, the point must again be made that the agency does not tell the same story every time. The use to which the 150 millions blbs. of crude is to be put seems to change depending upon the location of the forum.

In Plaquemine, Louisiana on February 14, 1977, and in Port Allen, Louisiana on February 15, 1977, the agency spokesman clearly stated that 60 percent of the early storage reserve would be used in the Baton Rouge-New Orleans area.

This statement would seem to be at direct odds with the indications in the Plan pages VI-9 and VI-13, as expounded in the Bayou Choctaw Final E.I.S. at pages 7-2 and 7-3.

As can be seen at least the impression given to all concerned is that all areas of the country will share in the E.S.R. in proportion to need and that need includes the need to keep refineries operating in New Jersey and Ohio.

Let me again thank the committee for allowing me to appear and for the courtesy shown me by all concerned.

Yours very truly,

JOSEPH W. COLE, Jr.

[From the Times-Picayune (New Orleans, La.), Feb. 29, 1977]

MARINE LOG

ARRIVALS—SATURDAY

SHIP, AGENT, and DESTINATION.

Mikunisan Maru, Strachan, Point, Continental Grain.

Kudu, Strachan, Napoleon ave.

Hawk, Smith & Johnson, Market st.

Pammstar Orchid, Kerr, Ostrica.

Sitala, Lykes, Garyville.

Warnemude, Moran, France rd.

Repulse Bay, Baton Rouge Marine, Baton Rouge.

Anakliys, TTT, Avondale.

Quizada, TTT, Harvey.

Post Energy, TTT, Nine Mile Point.

Tibrun IV, Burnside, Burnside.

Zannis Michalos, Oceans International, Point.

Mundogas Brasilia, Nopal, Good Hope.

Kazakhstan, TTT, Poydras St.

Conalco, Ore, Burnside.
Hellenic Leader, Hellenic, Orange st.
Good Carrier, Kaiser, Baton Rouge.
Konstatins G. Chimples, Gulf Shipping, Baton Rouge.
Golden Shimizu, Hansen-Tidemann, Point.
Aries Carrier, Hansen-Tidemann, Point.
Alexander Carras, Hansen-Tidemann, St. James.
Lannet, Strachan, Continental Grain.
Hoegh Rider, Strachan, Norco.
Sescci Camellia, International Ships, Point.
New Star, Norton-Lilly, St. James.
Lucia, Dalton, St. James.
Texaco Trinidad, Texaco, Convent.
Drucilla U., Uiterwyk, Galvez st.

SUNDAY

Armonia, TTT, Bienville st.
Astyanax, Smith & Johnson, Taft.
Yacu Guagua, Smith & Johnson, Market st.
Aniara, Binnings, Westwego, Harvey, Avondale
Aquadilla, P.R.M.M.I., France rd.
Angela Team, TTT, St. James.
Capricorn, TTT, Bulk Terminal.
Canadian Owl, Exxon, Baton Rouge.
Acadia Forrest, Central Gulf, St. Rose.
Konkar Intrepid, Biehl, Grain Elevator.
Fossheim, Hansen-Tidemann, Bulk Terminal.
Vishva Cevu, Norton-Lilly, Robin st.
Yakou Bondarenko, Norton-Lilly, Thalia st.
Linda Christensen, Rogers Terminal, Baton Rouge.
Ru Young, Lone Star, Piety st.
Corantijmn, Hansen-Tidemann, St. Andrew st.
Marabu, Uiterwyk, Baton Rouge.

IN PORT

Ship, agent, and berth
Tacoma, U.S. Navy, Poydras st.
Walch, U.S. Navy, Poydras st.
Virginia Star, Newton, Meraux.
Mospoint, Biehl, St. James.
Onoba, TTT, St. James.
Minilory, Southern Marine, Point.
Guatemala Maru, Kerr, Bulk Terminal.
Nopal Luna, Nopal, Esplanade ave.
Solana, Baton Rouge Marine, St. James.
Amoco Yorktown, Gulf Shipping, St. James.
Canadian Owl, Exxon, Baton Rouge.
Sealand Economy, Sealand, France rd.
Vincente Guerrero, Evans, Plaquemines.
Sithonia, Strachan, Todds.
Esso St. John, Exxon, Baton Rouge.
Sivella, Lykes, Garyville.
Peter L., Southern Marine, Bulk Terminal.
Passent Bonaire, Nordship, Gramercy.
Pentlikon, Strachan, Todds.
Jo Alaska, Hansen-Tidemann, Avondale.
Hellenic Carrier, Hellenic, Unknown.
Mini Labor, Southern Marine, Point.
Odessa, TTT, Poydras st.
Carlantic, Rogers Terminal, St. James.
Tagaytay, Biehl, Mandeville st.
Amazonas, Hall-Buck, Burnside.
IDDI, Baton Rouge Marine, St. James.
C.Y.S. Alliance, Baton Rouge Marine, St. James.
Piviere, TTT, Bienville st.
Hellenic Sky, Hellenic, Orange st.

Lenkoran, TTT, Alliance.
Virgo, Dalton, Garyville.
Union Progress, Dalton, Point.
Desert Song, Gulf Shipping Co., St. James.
Suriname, Hansen-Tidemann, St. Andrew st.
Mazada, Lone Star, Point.
Navios Patriot, Norton-Lilly, Unknown.
Hellespont Glory, Exxon, Baton Rouge.
Sitala, Lykes, Garyville.
Mini Lagoon, Southern Marine, Baton Rouge.
Rio Neug Quen, Strachan, Gov. Nicholls st.
Esso Boston, Exxon, Baton Rouge.
Aliakonn, Ore, Burnside.
Skyron II, Hansen-Tidemann, St. James.
Ocean Ranger, Gulf Coast, First st.
S. A. Kuneneland, Hansen-Tidemann, Baton Rouge.
Finn Enso, Strachan, Napoleon ave.
Asia Loyalty, Strachan, Napoleon ave.
Salcanty, Smith & Johnson, Bulk Terminal.
Gulf Supreme, Gulf Oil, Alliance.
Musilloud, Strachan, Gov. Nicholls st.
Carier Braxton, Waterman, Erato st.
Francais Marin, U.S. Navy, Bienville st.
Joseph Lykes, Lykes, Henry Clay ave.
Maritime Justice, Fritz Maritime, Napoleon ave.
Stolt Condor, Gulf Motorships, Unknown.
Stolt Zeus, Gulf Motorships, Unknown.
Pan Alliance, Exxon, Baton Rouge.
Lyke I, Dalton, Point.
Sara Lupe, Delta, Burnside.
Iberville, Waterman, Erato st.
Stolt Spar, Gulf Motors, Unknown.
Anak, Strachan, Market St.
Kalliopil., TTT, Baton Rouge.
Panamax World, Gulf Coast, St. James.
Paros, Strachan, Point, Public Grain.
Ocean Friend, Norton-Lilly, Point.
Stadium, Strachan, Point.
Rixia Oldendorff, Norton-Lilly, Point.
Knut Mark, Biehl, Reserve, Ama.
Daphne, Strachan, Poydras St.
Ciudad de Quito, Binnings, Celeste St.
Vikara, Strachan, Unknown.
Lago Atillan, Marine Chartering, Gramercy.
Lokris, TTT, Point.
Europa, Rogers Terminal, Nine Mile Point.
Kythnos, Strachan, Continental Grain.
Unique Fortune, Norton-Lilly, Burnside.
Asia Swallow, Dalton, Reserve.
Kapitan Kiri, TTT, Point.
Howell Lykes, Lykes, Andrew St.
Island Sky, Oceans International, Point.
Sauda, International Ships, Bonnet Carre Spillway.
World Ajax, Gulf Motorships, Point.
Frankfort, Biehl, Unknown.
Shuko Maru, Strachan, Destrehan.
World Pageant, Hall-Buck, Belle Chasse.
Juliana, Gulf Coast, Reserve.
Atlantico I, Dalton, Chalmette Slips.
Joseph D. Potts, Gulf Shipping, Washington Ave.
Ionianian Leader, TTT, Belle Chasse.
Valerian Kuybyshev, TTT, Point.
Mini Lymph, Southern Marine, Point.
Golar Sanko, Biehl, Ama.
Rio Belgrano, Strachan, Gov. Nicholis St.
Ranko Muru, Strachan, Point, Destrehan.
Ogden Loire, Strachan, Point, Destrehan.

Defiant, Strachan, Continental Grain.
Riruccia, Hansen-Tidemann, Point.
Captain W. D. Cargill, TTT, Point.
Montecello Victory, Hansen-Tidemann, Harvey.
Scherpenrecht, TTT, Belle Chasse.
Neptune Ruby, Binnings, Point.
Brussels, Biehl, Ama.
Industrial Prosperity, TTT, St. James.
King James, TTT, Point, Reserve.
Federal St. Laurent, Gulf Motors, Louisiana Ave.
Jasaka, TTT, Point.
Lily Bilner, TTT, Point.
Seibun Maru, TTT, Destrehan.
Zenkoren Maru No. 1, Strachan, Point, Ama.
B. R. Braeantia, Biehl, Destrehan.
Magnus Stove, Biehl, Point.
Gulf Prince, TTT, Point.
Concord Navigator, Gulf Coast, Point.
Goerlit, Biehl, Ama.
Sorrento, Hansen-Tidemann, Point.
Bjorholm, Biehl, Ama.
Sarvio, Unknown, Destrehan.
Argosy Pacific, Hansen-Tidemann, Point.
Echo Lake, Kaiser, Gramercy.
Del Oro, Delta, Napoleon ave.
Fredrick Lykes, Lykes, St. Maurice st.
Plan De San Luis, Evans, Alliance.
Ocean Rose, Fritz Maritime, Louisiana ave.
William C. Lawe, U.S. Navy, Naval Station.
Jean Lykes, Lykes, Andry st.
Allison Lykes, Lykes, Charbonnet st.
Del Rio, Delta, Louisiana ave.
Golden Cross, Burnside, Burnside.
Koraes, Hansen-Tidemann, Point.
Great Welfare, Burnside, Burnside.
Nathaniel Green, Watermann, Point.
Nancy Lykes, Lykes, St. Maurice.
Nordic Wasa, Hall-Buck, Burnside.
Trinity Challenger, Kerr, Ostrica.
Anco Empress, TTT, Harvey.
Sithonia, Biehl, Magabar.
Narwik Two, Dalton, Point.
Frotanorge, Dalton, Taft.
Mini Lot, Southern Marine, Baton Rouge.
Petalon, Hansen-Tidemann, Point.
Casper Trader, TTT, Unknown.
Eolia, Biehl, Public Grain.
Cristobal, Panama Canal Co., Poland ave.
Delta Brazil, Delta, Napoleon ave.
Sergey Yesenin, Smith & Johnson, Nashville ave.
Christopher Lykes, Lykes, Charbonnet st.

DEPARTURES—SATURDAY

Ship, Agent, Warf and Destination.
Ogden Loire, Strachan, Destrehan, Foreign.
Finn Enso, Strachan, Napoleon ave, Texas.
Frotanorte, Dalton, Taft, Foreign.
Vincente Guerrero, Evans, Plaquemine, Foreign.
Ocean Friend, Norton-Lilly, Ama, Foreign.
Sergey Yesenin, Sm & Johnson, Nashville ave. Florida.
Sorrento, Hansen-Tidemann, Reserve, Foreign.
Jo Alaska, Hansen-Tidemann, Baton Rouge, Foreign.
C.Y.S. Alliance, B. R. Marine, St. James, Foreign.
Iddy, B. R. Marine, St. James, Foreign.
Virginia Star, Newton, Meriaux, Foreign.
Sealand Economy, Sealand, France rd., Florida.

Carlantic, Rogers Term, Reserve, Foreign.
Ciudad De Quito, Binnings, Cleste st, Foreign.
Hellenic Sky, Hellenic, Orange st., Texas.
Odessa, TTT, Poydras st., Foreign.
Jasaka, TTT, Reserve, Foreign.
Salcanty, TTT, Bulk Term, Texas.
Nopal Lunar, Nopal, Esplanade ave., Foreign.
Desert Song, Gulf Shipping, St. James, Foreign.
Amazonas, Hall-Buck, Burnside, Texas.
Skyron II, Hansen-Tidemann, 9 Mi. Point, Foreign.

SUNDAY

Sivela, Lykes, Garyville, Gulf.
Guatamala Maru, Kerr, Congress st., Foreign.
Solana, B. R. Marine, St. James, Foreign.
Kazakhstan, TTT, Poydras st., Foreign.
Mundogas Brasilia, Nopal, Good Hope, Texas.
Pivuron IV, Burnside, Burnside, Texas.
Stolt Condor, Gulf Mtrshps, Unknown, Foreign.
Stolt Zeus, Gulf Mtrshps, St. Rose, Foreign.
Amoco Yorktown, Gulf Shipping, St. James, Foreign.
Passant Bonaire, Nordship, Gramercy, Pensacola.
Palm Star Orchid, Kerr, Ostrica, Foreign.
Kudu, Strachan, Napoleon ave., Mobile.

(This information was compiled by the Associated Branch Pilots for The Times-Picayune).

Mr. DINGELL. The Chair calls as its next witness Mr. Jesse M. Calhoon, president, Marine Engineers' Beneficial Association.

Mr. Marlowe is presenting a statement on behalf of Mr. Calhoon. If you will identify yourself for the record, we will be glad to hear your statement.

STATEMENT OF HOWARD MARLOWE, REPRESENTING NATIONAL MARINE ENGINEERS' BENEFICIAL ASSOCIATION, AFL-CIO

Mr. MARLOWE. Mr. Chairman, I am Howard Marlowe. I am a member of a consulting firm, Ruttenberg and Associates, here in Washington, D.C., which is employed by the Marine Engineers' Beneficial Association to do research in energy and transportation matters. With your permission, I would like to refer to some portions of Mr. Calhoon's statement.

Mr. Calhoon is president of the Marine Engineers' Beneficial Association. He is out of town at a union conference today and could not be here, but wanted very much for the views of his membership to be before this committee.

Mr. Chairman, following passage of the Energy Policy and Conservation Act of 1975, the Marine Engineers' Beneficial Association sponsored the preparation of a report which focused on the strategic petroleum reserve which was created by that law. A copy of that report has been given to the committee staff. It made two major recommendations.

First, crude oil from the Elk Hills reserve should be used to fill up a portion of the strategic reserve; and second, tankers should be used to store a portion of the oil in the strategic reserve.

The thrust of Mr. Calhoon's statement discusses the proposal of the union to store residual fuel oil for use in New England. A portion of the residual fuel oil to be used for New England would be stored

aboard tankers stationed either off New England or off the New York coastline.

It is important that this committee know what happened when the union addressed its recommendations to the Federal Energy Administration on March 12 of last year. On the 30th of the same month, FEA Administrator Zarb wrote to Mr. Calhoun saying, "While the use of tankers and barges for strategic storage appears to be feasible, preliminary cost and environmental analysis has revealed that this alternative is less attractive than certain potential underground storage sites * * *".

Mr. Calhoun then made a request under the Freedom of Information Act for the cost and environmental data to which Mr. Zarb referred in his letter. When that information finally was received in October, it was not responsive to our request. Cost data for specific underground sites was excised from the data supplied to us by FEA so that it was impossible to make any comparison between the costs of specific underground storage sites—for which FEA cited no figures—and the costs of tanker storage—for which FEA cited only unsubstantiated figures.

Mr. Chairman, the statement goes into some detail about the further correspondence which FEA provided to the Marine Engineers' Beneficial Association.

What I think is important to understand is this: FEA at no time has come forth with any information which identifies with substantiation its costs for storage aboard tankers, storage of either crude oil or petroleum products. There is some reference, as I recall, in the strategic petroleum reserve plan of December 15 to a cost of \$6 per barrel. That is an FEA statement which is once again not substantiated. In fact, Mr. Chairman, I would suggest to you and to this subcommittee that FEA has within its possession figures from other sources which indicate that the storage of petroleum aboard tankers will be cheaper than storage underground.

I want to make it very clear that we are not saying that no oil should be stored underground. What we are saying is very simple. There should be a residual fuel storage for New England and some of that fuel oil storage should be aboard tankers.

I would like to address a couple of points which FEA has made with regard to tankers. FEA has stated that the economics of tanker storage are very unfavorable when compared to salt domes and existing mines. Mr. Chairman, we urge this subcommittee to have FEA supply its correspondence from the Maritime Administration, the Coast Guard, and from any private consultants which it has employed which relate to the costs of tanker storage.

In short, we challenge FEA's ability to substantiate their tanker cost conclusions, and we urge this committee to direct that FEA reconsider its opposition to tanker storage.

In addition, FEA says the environmental hazards of using tanker storage are, to use their word, "major." In light of the recent tanker accidents, this point may seem to be valid, but it is not. No vessel in the floating storage reserves which the Marine Engineers is proposing would be used unless it has first been inspected thoroughly, carries adequate safety and navigation equipment, is structurally sound and completely seaworthy and is manned by properly trained U.S. crews.

All vessels in the floating reserves would be moored securely and under constant inspection.

In addition, the so-called "venting" problem which is cited by FEA in its December 15 Strategic Petroleum Reserve Plan is grossly exaggerated. In fact, FEA's comments on this subject are little more than unintelligible nonsense.

Mr. Chairman, the use of a floating reserve has many advantages. Not only are tankers less costly than underground storage, they are also more flexible. Tankers can be moved from one refinery or demand region to another as needs and demand patterns change. Underground storage sites are fixed. Less than one percent of oil stored in tankers is lost in the recovery process while the figure for underground storage is around 6 percent.

In addition, Mr. Chairman, tanker storage would be available far sooner than the underground sites. The strategic reserve plan before this committee does not meet the timetable requirement of the statute. With the continued political instability in the Middle East and other parts of the world, it is essential that the United States act as quickly as possible to establish its strategic petroleum reserve.

The use of tankers is an integral part of the total reserve plan which will help us to meet that objective.

That completes the statement I wanted to make. I will be happy to answer any questions you might have.

[Mr. Calhoun's prepared statement follows:]

STATEMENT OF JESSE M. CALHOON, PRESIDENT, MARINE ENGINEERS' BENEFICIAL ASSOCIATION

Mr. Chairman, the Strategic Petroleum Reserve is a good idea. It was conceived in the aftermath of the Arab oil embargo when the United States saw how vulnerable our oil supply was. Before the embargo, we got about 25 percent of our oil from the Arab countries; today, the figure is over 43 percent. If we are to limit our vulnerability, we must have a strategic reserve of petroleum.

Unfortunately, the idea for a strategic reserve got into the hands of the Federal Energy Administration which, under the last administration, saw its mission as one of being the protector of the oil industry and its allied interests. The reserve plan prepared by the Ford Administration will give this country an emergency supply of petroleum at a price—and in a manner—which is beneficial to the oil companies and detrimental to the American consumer.

Following passage of the Energy Policy and Conservation Act of 1975, the Marine Engineers' Beneficial Association sponsored the preparation of a report which focused on the Strategic Petroleum Reserve which was created by that law. A copy of that report has been given to the committee staff. It made two major recommendations.

First, crude oil from the Elk Hills Reserve should be used to fill up a portion of the strategic reserve; and second, tankers should be used to store a portion of the oil in the strategic reserve.

Mr. Chairman, it is important that this committee know what happened when we addressed our recommendations to FEA on March 12th of last year. On the 30th of the same month, FEA Administrator Zarb wrote to me saying: "While the use of tankers and barges for strategic storage appears to be feasible, preliminary cost and environmental analysis has revealed that this alternative is less attractive than certain potential underground storage sites. . . ."

I then made a request under the Freedom of Information Act for the cost and environmental data to which Mr. Zarb referred in his letter. When that information finally was received in October, it was not responsive to our request. Cost data for specific underground sites was excised from the data supplied to us by FEA so that it was impossible to make any comparison between the costs of tanker storage—for which FEA cited no figures—and the costs of underground storage—for which FEA cited only unsubstantiated figures.

FEA did provide us with two letters it had received from the Maritime Administration. The first—dated January 26, 1976—urged FEA to undertake a pilot program to assess the costs and environmental consequences of tanker storage. It cited costs for that pilot program, which was to involve only two privately-owned U.S.-flag tankers for a six month period. These costs were applicable only to the pilot program, and not to any on-going tanker storage.

The second letter—dated March 9, 1976—makes it clear that MarAd considered its cost estimates contained in the first letter to be only preliminary. In this second communication, MarAd complained that FEA had failed to provide adequate information on the quantities and types of crude oil to be stored and that FEA had under-estimated the number of Jones Act vessels which would be available for tanker storage.

Finally, and most importantly, MarAd objected to FEA's statement that the proposal to use ocean tankers for storage had been eliminated. This letter leads to the conclusion that FEA had eliminated the tanker storage alternative by March 9th, if not before. In doing this, FEA acted on what were only preliminary cost estimates. We have been unsuccessful in getting FEA to give us its own estimates of tanker storage costs despite the fact that we believe FEA has such estimates and that the estimates show that tanker storage is cheaper than underground storage.

They don't want to part with this information because they never had any intention of using tankers for storage. In fact, it is clear that FEA quickly settled on underground storage and then put blinders on so that no other alternative could get in their way.

In its Strategic Petroleum Reserve Plan of December 15, 1976, FEA makes several unsupported statements in opposition to tanker storage. First, they say there is no precedent for the use of tankers for this purpose. But this country stored grain aboard tankers during the 1950's, and other countries—such as Japan—have tanker storage programs for crude oil underway.

Second, they state that "the economics of tanker storage are very unfavorable when compared to salt domes and existing mines. Mr. Chairman, we urge this committee to have FEA supply its correspondence from the Maritime Administration, the Coast Guard, and from any private consultants which relate to the costs of tanker storage. In short, we challenge FEA's ability to substantiate their tanker cost conclusions, and we urge this committee to direct that FEA reconsider its opposition to tanker storage.

Third, FEA says that the environmental hazards of using tanker storage are "major". In light of the recent tanker accidents, this point may seem to be valid, but it is not. No vessel would be used in the Floating Reserve we propose unless it first has been inspected thoroughly, carries adequate safety and navigation equipment, is structurally sound and completely seaworthy, and is manned by properly-trained U.S. crews. All vessels in the Floating Reserve would be moored securely and under constant inspection. In addition, the so-called "venting" problem cited by FEA is grossly exaggerated. In fact, FEA's comments on this subject are little more than unintelligible nonsense.

The use of a Floating Reserve has many advantages. Not only are tankers less costly than underground storage, they are also more flexible. Tankers can be moved from one refinery or demand region to another as needs and petroleum demand patterns change. Underground storage sites are fixed. Less than 1 percent of oil stored in tankers is lost in the recovery process, while the figure for underground storage is around 6 percent.

In addition, Mr. Chairman, tanker storage would be available far sooner than the underground sites. The Strategic Reserve Plan before this committee does not meet the timetable requirements of the statute. With the continued political instability in the Middle East, it is essential that the United States act as quickly as possible to establish its strategic petroleum reserve. The use of tankers is an integral part of the total reserve plan which will help us to meet that objective.

The facts are on the side of a Floating Reserve, but FEA has spent the last year trying its hardest to ignore or avoid those facts. They have told us they cannot reveal the precise costs of underground storage because to release that information "prematurely" would undermine FEA's "flexibility in negotiating construction and operating contracts for particular storage projects."

Mr. Chairman, you and I know what "flexibility" means, but it means something entirely different to FEA. To them, flexibility means: "We know something that you don't know, and—if we have our way—you'll never find out until it's too late to do anything about it." We hope this attitude will change under the new administration.

FEA knows—or it ought to know—that its published cost estimates for underground storage site acquisition are understated. And FEA knows—or it should know—that the owners of those salt domes and mines stand to make a bundle from the strategic reserve program. That is information which should come out now, not when it is too late for us to do anything about it.

Mr. Chairman, I have talked at some length about one of our two recommendations. We also urged that oil from Elk Hills be used to fill the Strategic Reserve. That oil can be acquired for about \$2 per barrel plus transportation costs. Unfortunately, the last administration chose to begin selling Elk Hills oil to the highest bidders, thus resulting in a situation where FEA has now recommended that oil for the strategic reserve be acquired at the composite price of domestic and imported oil. Not only is this situation ludicrous, but FEA has also recommended a method of reserve oil acquisition which, by its own admission, will raise petroleum product prices to the consumer. All of this is done so as to minimize the "adverse impact on the competitive environment in the (oil) industry." Stated more bluntly, FEA doesn't want to do anything that might upset the oil companies, even if it means that American taxpayers and consumers will have to pay the price for their timidity.

If the decision is made to go out on the market to acquire oil for the strategic reserve, we think Congress should amend the law to provide that oil carried aboard U.S.-flag ships will be considered part of the reserve while it is in transit. The United States has control over these ships in the event of another embargo. It stands to reason that any oil carried by U.S.-flag vessels should be considered part of our Strategic Petroleum Reserve.

Mr. Chairman, the establishment of a Strategic Petroleum Reserve is a vital part of the national energy plan which Congress and the new administration will be developing and of our drive for domestic energy independence. We cannot afford to let the Strategic Petroleum Reserve Plan of the last administration stand as is.

The members of our union urge this committee to make it clear to FEA that the current reserve plan is unacceptable because it fails to meet the statutory timetable, because it fails to make use of alternative storage facilities, and because its price tag to the American taxpayer and consumer is too high.

Mr. DINGELL. You have made some comment with regard to cost data on this matter on page 2, and the committee will ask that FEA give us the cost data so we can evaluate the two figures and make some judgments.

Mr. MARLOWE. If you like, if it might be helpful, I could try to provide the committee with some estimates that we have developed so you have some basis of reference.

Mr. DINGELL. I think it would be valuable if you did so.

Mr. MARLOWE. Let me give you two or three figures we have now, and we will be happy to supply additional material. [See letter dated March 1, 1977, p. 269.]

Over a 3-year period, we calculate that the cost per year for each of the 3 years of floating storage would be between 80 and 90 cents a barrel. We have calculated using data supplied by FEA salt dome storage also over a 3-year period on a per year basis of approximately \$1.50. There is a savings of 47 or 50 percent by using tanker storage versus underground storage.

Mr. DINGELL. That is very true if you take 3 years, but if you take 6 or 12, where does your figure go?

Mr. MARLOWE. I will give you a 10-year figure then. The 10-year figure for floating storage that we calculated was approximately 40 cents a barrel.

Mr. DINGELL. Forty cents a year?

Mr. MARLOWE. Forty cents per year.

Mr. DINGELL. So that is \$4?

Mr. MARLOWE. \$4 to \$4.25 were the estimates for 10 years.

Mr. DINGELL. \$4 to \$4.25?

Mr. MARLOWE. Right. For salt dome storage we calculate a total cost of about \$4.60 to \$4.70. That is 46 to 47 cents per year. Even on a 10-year basis there is still a savings of a few percent using tanker storage. We believe that FEA has data which comes from other sources that might substantiate our figures.

Mr. DINGELL. With all respect, how did tanker storage prices go up so quickly over the 7 years following the first 3? The first 3, it is pretty obvious you had a high initial cost on salt dome storage. How did the cost go up over the fourth to the seventh year?

Mr. MARLOWE. Basically these are in a category of recurring costs. For instance, the tanker storage we envision is using groups of approximately six tankers, one of them acting as the mother ship supplying power to the other five ships. There would be under the proposal a crew of approximately 24 members which would be responsible for maintaining all 6 ships. The recurring costs on that basis, over a 3-year period are approximately 50 to 60 cents per barrel, but when you get to 10 years, you are not quite tripling that figure.

Mr. DINGELL. Are you not paying tanker leases?

Mr. MARLOWE. Either tanker leases or the Government is going to buy these tankers and, let's say, amortize them over a stated period.

Mr. DINGELL. A tanker lease is what? If you are buying a junker, an old tub, it might be one figure. But the probability is if you are buying an old tub, it is not going to have a 10-year storage life anyway.

Mr. MARLOWE. Let me put it in two parts first. The union suggested first that available U.S.-flag tankers be used, but there are not that many available U.S.-flag tankers. So we next had to look what our other sources—

Mr. DINGELL. Foreign—

Mr. MARLOWE. We are talking about chartering foreign tankers, but foreign tankers which have been purchased by U.S.-shipping companies or by the U.S. Government and placed under U.S.-flag registration.

Mr. DINGELL. As I recall, the cost of a tanker on a daily basis is approximately \$2,000 to \$4,000.

Mr. MARLOWE. The type of cost which I think the chairman is referring to would basically be for a tanker in operation. We are talking about a tanker that is standing still. The costs are relatively minimal.

Mr. DINGELL. How minimal?

Mr. MARLOWE. On our own costs, we have a capital cost of 54 cents per barrel.

Mr. DINGELL. What is that on a daily rate for the tanker'?

Mr. MARLOWE. I do not have that information offhand.

Mr. DINGELL. How many barrels do you figure in that tanker?

Mr. MARLOWE. We are talking 100,000 deadweight tons shipped, approximately 700,000 barrels.

Mr. DINGELL. And you figure how much?

Mr. MARLOWE. Capital costs are around \$0.54.

Mr. DINGELL. 54 cents a barrel?

Mr. MARLOWE. Right.

Mr. DINGELL. 54 cents. I will see how my arithmetic comes out here; \$37,800,000 for over what period of time—I dropped a decimal

point. \$378,000 over what period of time? Your 54 cents figure is for over what period of time?

Mr. MARLOWE. We were figuring a 54 cents cost per year.

Mr. DINGELL. Per year? You are talking about \$378,000 per tanker per year. At 7 million barrels—Mr. Potter says it is about \$1,000 per day per tanker.

Mr. MARLOWE. I take his word for it.

Mr. DINGELL. That is about half the crude cost with the vessel functioning and operating?

Mr. MARLOWE. That is correct.

Mr. DINGELL. If you are going to pay \$1,000 a day and you are going to have 7 million barrels in the tanker and you are talking about 500 million barrels, how much of this do you propose to store in tankers?

Mr. MARLOWE. Between 4 and 8 million barrels.

Mr. DINGELL. Between 4 and 8 million barrels. You are only talking about using then about one tanker at 7 million barrels, are you not?

Mr. MARLOWE. No, I believe the figure for one tanker would be 700,000 barrels.

Mr. DINGELL. So you are talking about 10 tankers?

Mr. MARLOWE. Approximately.

Mr. DINGELL. That is \$10,000 a day or \$3,780,000 a year for 10 tankers. But 7 million barrels is a piddling amount.

Mr. MARLOWE. We are talking about residual fuel oil. We are talking about a reserve from New England. We are estimating the need for New England reserve would be some 15 to 17 million barrels residual reserve. We are talking about storage of a quarter to a half of this aboard tankers.

Mr. DINGELL. This resid, as I understand, goes into the tanker liquid, but it goes in hot?

Mr. MARLOWE. It would have to be heated.

Mr. DINGELL. Then it is cooled off; it sets like concrete?

Mr. MARLOWE. Yes.

Mr. DINGELL. How are you going to get it out?

Mr. MARLOWE. We are going to continue to heat it.

Mr. DINGELL. Continue to heat it?

Mr. MARLOWE. That is figured in the cost.

Mr. DINGELL. How many barrels of this stuff are you going to use to heat this over 10 or 20 years you are going to keep it in reserves?

Mr. MARLOWE. I do not have with me the precise figure, but I can recall we developed the specific figure for the heating cost on a per barrel basis and we can do it. It is very minimal.

Mr. DINGELL. Your staff has been awfully good friends with me over the years. I listen very respectfully to what you say. I have great troubles with the ideas about heating a tanker sitting in cold water. I am not sure how much I am going to be heating water and how much I am going to be heating resid.

Mr. MARLOWE. I will be happy to have Mr. Calhoon respond to that question so we know precisely where that heat would be going. There is heating already done in the cargo holds of ships.

Mr. DINGELL. I am aware of that. I think that at the end of 10 years you would have burned all this residual oil and probably more

just to store it for the 10-year period. Can you give me an answer on that point?

Mr. MARLOWE. Not off the top of my head. But I would be happy to tell you what amount of fuel would be required for the ship. I will be happy to supply that. [See letter dated March 1, 1977, p. 269.]

Mr. DINGELL. You are talking about heating a very large amount of oil. It is going to take a lot of heat. A lot of heating is produced by burning a lot of oil.

Mr. MARLOWE. The best I can give you off the top of my head is what we calculated as the cost of fueling the ships on a per barrel basis per year.

Mr. DINGELL. What would that be?

Mr. MARLOWE. We calculate it at 12 cents a barrel.

Mr. DINGELL. At 12 cents a barrel. How much is resid a barrel? Residual fuel oil is \$12 a barrel.

Mr. MARLOWE. Approximately \$12 or \$13.

Mr. DINGELL. So you are talking \$12, so that is 10 cents a barrel, that is 10 cents a barrel every year. It is 1 percent, so at the end of 10 years you burn up 10 percent of your resid just keeping it liquid; is that right?

Mr. MARLOWE. It seems to be to me.

Mr. DINGELL. As I read your arithmetic, at the end of 10 years, you burn 10 percent of your resid just to keep the stuff liquid; is that right?

Mr. MARLOWE. Yes; basing my answer on the calculations you did, I think that is correct.

Mr. DINGELL. I am curious. Is that good business judgment?

Mr. MARLOWE. In what way do you mean that, sir? We are talking about being able to supply New England which has no refineries of its own and which would have to depend upon the ability of either refineries in the gulf coast or the Caribbean to refine its residual fuel oil with some closer access—

Mr. DINGELL. There are advantages in using foreign refineries to generate that resid. I am still curious about whether this is good business from the standpoint of the taxpayers.

Mr. MARLOWE. If you looked at it from the standpoint of the cost advantage, we believe it is because there is a cost advantage. And if you want to look at the comparisons, if they stored that residual fuel oil, which they cannot do and which they do not intend to do, if they stored it underground, the cost advantage would be substantial.

Mr. DINGELL. Of course you are not going to store residual fuel oil in the ground.

Mr. MARLOWE. That is correct. It would be impossible to do.

Mr. DINGELL. You could do it very nicely, you just would never get it out.

Mr. MARLOWE. That is right. I should point out, Mr. Chairman, under the proposal we have made, the number of jobs for members of the marine engineers is approximately six jobs. We are not here just talking about six jobs.

Mr. DINGELL. I know the marine engineers. You would not be down here about six jobs.

You have given us some interesting things to think about. The Chair is going to request the staff to check these matters out with FEA and give us cost estimates.

Mr. MARLOWE. We very much appreciate it.

Mr. DINGELL. We do thank you for your kindness to us. I think you have given us something interesting to chew on.

Mr. MARLOWE. Thank you.

[The following letter was received for the record:]

RUTTENBERG, FRIEDMAN, KILGALLON, GUTCHESS & ASSOCIATES, INC.,
Washington, D.C., March 1, 1977.

Hon. JOHN DINGELL,
Chairman, Subcommittee on Energy and Power, Committee on Interstate and Foreign
Commerce, U.S. House of Representatives, Washington, D.C.

Dear Mr. CHAIRMAN: During my testimony on behalf of the Marine Engineers' Beneficial Association at the hearing held by your subcommittee on the strategic petroleum reserve, you requested that I supply the subcommittee with additional information pertaining to our cost estimates for storage of residual fuel oil aboard tankers.

Our estimates are based on tankers of about 100,000 DWT which would be purchased from foreign sources for about \$2.5 million each. These tankers are less than 10 years old and are lying idle due to the depressed nature of the world tanker market.

Assuming a 10-year period, the costs for floating storage are as follows:

	Per barrel
Initial.....	\$3.70
Operational.....	1.50
Loss during storage and recovery.....	.12
Salvage.....	-1.10
Total cost.....	4.22
Total per year.....	.42

Please note that "salvage" represents the fact that, at the end of the strategic reserve program, tankers could be sold for scrap value if not put to another use.

The comparable cost analysis for salt dome storage is as follows:

	Per barrel
Initial.....	\$2.92
Operational.....	1.10
Loss during storage and recovery.....	.61
Salvage.....	
Total cost.....	4.63
Total per year.....	.42

In addition, during my testimony, you asked several questions pertaining to the use of fuel required for the ships which would be involved in the floating reserve. While it may be true that a ship would use one-tenth of its stored supply during the course of a year, it should be realized that only one ship out of each group of six or more ships would be burning that amount of fuel. The other ships in the group would be burning no fuel. Any power used on these latter ships, including any heat required, would come from the one mother ship. A recent study conducted for the Federal Energy Administration assumed that there would be fifteen ships in a group.

Finally, it should be understood that the one-tenth assumption to which I referred in the preceding paragraph is open to question. This estimate would be valid if the residual were heated to the point where it could be off-loaded at a moment's notice. There are experts who believe that this high degree of constant heating would not be necessary; that the residual fuel could be moderately heated on a constant basis with maximum heating required only immediately prior to off-loading.

It should also be pointed out that our discussion on this point revolved around a net energy cost for tanker storage. A similar net energy analysis should also be done for underground storage. There, energy will be consumed in the following activities, among others: building the underground storage sites, building pipelines and other facilities required, transporting the oil to those sites, transporting that oil from those sites to refineries, and transporting refined products to demand

regions. Energy will be consumed in each of these activities. If the net energy costs of floating storage are to be estimated, then the net energy costs of underground storage should be estimated, as well.

Sincerely,

HOWARD MARLOWE,
Associate.

Mr. DINGELL. If there is no further business to come before the committee, the committee will stand adjourned. The Chair observes we will be meeting on Tuesday the 22d to consider H.R. 130 which is dealer franchising legislation. The Chair is advised by staff the notices either have or will be going forthwith on that matter.

The committee stands adjourned.

[The following statements, letters, and telegram, were received for the record:]

TESTIMONY OF ALFRED S. HARRIS, MANAGER, STATE ENERGY OFFICE,
STATE OF HAWAII

Contained herein is the State of Hawaii's evaluation and response to the analysis and finding of the Federal Energy Administration with respect to the requirements for noncontiguous area storage contained in Section 154 of the EPCA.

The State is deeply concerned that this plan function, as intended by Congress, to diminish the vulnerability of all of the States to the effects of a severe energy supply interruption and provide limited protection from the short-term consequences of interruptions.

While the 1973 oil embargo may have come as something of a shock to much of the United States, Hawaii has had a great deal of experience with such shortages. We are constantly made aware that much of our essential needs are imported across thousands of miles of water. Hawaii, which is as far from Los Angeles as San Francisco is from Washington, is captive to imports of food, consumer goods and energy among other things. In spite of these handicaps, the State has committed itself to the development of a balanced economy. Consequently we are vitally interested in Hawaii's agriculture and defense industries; and we are serious in our attempts to develop a share of an industrial base for the Mid-Pacific. We have come a long way towards this goal of a balanced economy since we were accepted for statehood in 1959.

However, realization of a balanced economy depends upon energy and Hawaii is over 90% dependent upon foreign supplied petroleum.

This foreign petroleum dependence is even more critical because petroleum is virtually the only source on energy in the islands. This is why Hawaii enthusiastically supported the Strategic Storage Reserve (SPR) Program. Perhaps more than any other area of the country, we see the need for such a program to avert the disaster that could befall us in the event of an embargo. Congress recognized the special circumstances involved in maintaining the security of supply for areas like Hawaii when the included Section 154 of the EPCA. This Section states: "The Strategic Petroleum Reserve Plan shall be designed to assure, to the maximum extent practicable, that each noncontiguous area of the United States which does not have overland access to domestic crude oil production has its component of the Strategic Petroleum Reserve within its respective territory."

Given this clear statement of Congressional intent, we were then extremely disappointed to find that the Strategic Petroleum Reserve Plan submitted by the FEA to Congress on 15 December 1976 makes no recommendation for Strategic Petroleum Reserves to be located in or near the State of Hawaii, nor does it in our opinion provide any reasonable or acceptable means of supplying Hawaii in the event of an embargo. The program text states "that the costs and environmental hazards of storing a portion of the SPR in Hawaii are so undesirable, and the benefits, if any, of such storage would be so minimal, that it would not be practical to store a component of the SPR within Hawaii." (Page 131) All of the SPR is to be concentrated in central storage facilities principally in the U.S. Gulf Coast area. We believe that a closer examination will show first, that if all the costs rightly attributable to the program are included, the cost of storing a portion of the SPR in Hawaii is less, not more than central storage proposed by the FEA.

Secondly, that there is no unacceptable "environmental hazard" of storing the petroleum products in Hawaii. In fact, the environmental effects and potential for damages may be far less by storing in Hawaii than in central storage as proposed by the program. The operational benefits of storing petroleum for use in Hawaii are vastly superior to storing that oil in a central storage location in the Gulf Coast six thousand miles from Hawaii via a tenuous Panama Canal which restricts the size vessel that can be used, vessels which may or may not be available at the time of the embargo.

In summary, the SPR program, as it has been recommended to Congress, will not meet the needs of Hawaii in an emergency affecting its energy supply. If it finally does supply energy to Hawaii, it will be more costly than would have been provided had the storage been in Hawaii in the first place, it will arrive through a system with more potential for environmental damage than would have been the case had it been stored in Hawaii, and it will be late. It will arrive after some or all of our vital industries are shut down and after shortages have wreaked havoc with the economics of the State. It is our earnest request that the Congress reaffirm its position that noncontiguous areas of the United States be protected with their own component of the Strategic Petroleum Reserve Program. Specifically, it is requested that Congress direct that 10 million barrels of Strategic Petroleum Reserves, Hawaii's proportional component of the 500 million barrel SPR based on the proportion of imports used in Hawaii, be established in Hawaii.

The following are specific comments regarding the Strategic Petroleum Reserve Plan of 15 December 1976 as it applies to Hawaii.

ENVIRONMENTAL HAZARDS

The SPR plan (page 10, paragraph 5; page 131, paragraph 2) concludes that no storage should be put in Hawaii because of the undesirable "environmental hazards." No site specific study has been made to support this conclusion. The main concern seems to be with hydrocarbon emissions from steel tankage. While we concede that the hydrocarbon emissions from steel tankage would be larger perhaps than from salt domes, we must point out that emissions from a standing storage are extremely low, particularly in an area which has a very narrow temperature range. Further, Hawaii is surrounded by 2,000 miles of ocean. Its atmosphere is regularly washed by trade winds. It must be noted that Hawaii has no current restriction to new point source construction while the salt dome locations are not in clear air compliance areas.

On the other side of the ledger, we should consider in the central storage program the emissions and potential for oil spills that will exist when oil is transferred from crude tankers to lighters to barges to surge tanks and then to salt dome storage. We note for example that the Bayou Choctaw Salt Dome final EIS (page I-22,23) calls for three 150,000 barrel surge tanks, one 10,000 barrel fuel oil tank, six 200,000 barrel oil surge tanks, one 100,000 barrel ballast water surge tank and one 25,000 barrel fuel oil tank. This one salt dome alone will build and utilize over a million and a half barrels of steel tank storage! Such surge tank storage would not be necessary for Hawaii. Recent history has clearly pointed out the substantial environmental exposure in moving petroleum liquids by sea. The Hawaii storage option involves one loading in the Far East and one unloading at Hawaii directly into the storage facility. The central storage option involves an extra 12,000 miles of transportation and six separate loading, lightering, barge loading and unloading operations with the concomitant increased environmental exposure.

COST OF STORAGE

The SPR Plan states that the cost of steel tankage is \$10.57 per barrel as against \$2.24 per barrel for salt dome storage (page 127, paragraph 4). This purported \$8.33 gap in the storage facility cost in effect precludes any consideration of steel tanks in Hawaii. Data has been submitted to the FEA, however to establish the cost of construction of steel tankage in Hawaii in the vicinity of \$7.00 per barrel. Nevertheless, the cost of the steel tankage alone is not the only factor which needs to be considered in the analysis. When the full system cost is developed including the transportation to the Gulf Coast during nonembargo times and transportation to Hawaii during embargo periods, we find that in only one cycle of use the cost of storing and delivering the oil to Hawaii would be \$9.56 per barrel as opposed to \$10.65 per barrel in central storage. If we went through five cycles of use as are suggested in the Bayou Choctaw Salt Dome EIS (page 1-32) the additional cost of storing the crude oil in the Gulf Coast versus storing in Hawaii would be astronomical. An analysis of the full system cost is enclosed (Enclosure 1).

NONDISCRIMINATORY ACCESS

The Conference Substitue Report for the EPCA stated that if it is not practical to store a portion of the SPR in Hawaii, that noncontiguous areas should be assured of ready and non-discriminatory access to petroleum products stored elsewhere (SPR Plan, page 98, paragraph 3). We question how Hawaii can have non-discriminatory access to Gulf Coast storage. Who but Hawaii will have to ship the petroleum 6,000 miles from the Gulf Coast to Hawaii through the Panama Canal? The cost of this shipping which is to be passed on to the customers through industry, we estimate to be on the order of \$3.56 per barrel or approximately 8 cents per gallon. This transportation cost is more than ten times the estimated cost of distributing the reserves to mainland customers of 25 to 30 cents per barrel or less than 1 cent per gallon. We see no way that the present plan can meet the requirement for non-discriminatory access with centralized storage facilities in the Gulf Coast.

DIVERSION FROM WEST COAST

The Strategic Petroleum Reserve Plan (page 114, paragraphs 3 and 6; page 118, paragraph 2) indicates that Hawaii's needs can be supported by the diversion of crude and products from the West Coast. We seriously question whether this is a viable option. In December FEA published a study on the disposition of Alaskan crude concluded that the West Coast will continue to import 300-500,000 barrels per day of low sulphur foreign crude oil, and an additional 130,000 barrels per day of foreign products in 1980 and beyond. These low sulphur imports will be required because of quality requirements which are not met by the Alaskan North Slope crude. In fact, the trend on the West Coast is toward more and more use of high quality, very low sulphur, fuel oil produced from foreign crude oil. (See article in Enclosure 2). However, even without this consideration, the West Coast will be dependent on imports for 19-24% of its petroleum supply. These imports have traditionally come from the same areas that supply Hawaii. We question how much help Hawaii can really expect from the West Coast if 19-24% of their petroleum energy supply is interrupted. Curiously, this SPR Plan states that only 70,000 barrels per day of the total West Coast demand will be imported crude. This is in direct conflict with the very detailed North Slope crude study titled "North Slope Crude: Where to?—How?" (Reference page 135). There is no support given for the figure used in the SPR Plan. (Reference page 102, table V-2).

CRUDE INVENTORIES

According to the SPR Plan (page 117, paragraph 6), there will be sufficient crude in inventory and in transit to "continue normal refinery runs" until crude is replaced from the SPR. Hawaii's two refineries each have more than 30 days of crude supply on hand and en route. This exceeds the 26-day average inventory for all of the West Coast refineries (page 115, paragraph 3 of the SPR Plan). It should be noted that the West Coast inventory undoubtedly includes both the production and the pipeline storage as well as refinery storage. Hawaii's two refineries are supporting higher inventories than their mainland competition. Nevertheless, according to the SPR Plan (Reference pages 116 and 130), it would be approximately 63 days before crude can be delivered to Hawaii from central storage. This assumes that the Hawaiian refineries can find U.S.-flag tankers of the proper size to transit the Panama Canal, that the Panama Canal is open, and that we are ready to pay the almost 8¢ per gallon freight over and above what other U.S. consumers will pay. Allowing for the standard 10-day minimum inventory according to the methodology of the FEA; this leaves a gap of 43 days during which Hawaii's refineries would be without crude oil. Apparently the SPR Plan does not consider Hawaii's refineries when it assures us that "normal refinery runs" will continue. As we stated earlier, Hawaii is not only interested in supplying Hawaii; we are attempting to build a viable, economic, industrial base in Hawaii. Obviously such an economic diversification program cannot be based on a planned 43-day shutdown of 60% of the refining capacity in the State. The impact of such a shutdown is increased because the refinery involved is classified as small and independent and does not have access to its own crude oil production as does the major oil company owned refinery in the State. Certainly this does not seem to be consistent with non-discriminatory treatment required by the Congress.

INTERRUPTION SCENARIOS

Although the SPR Plan reports quite correctly that the Pacific including Hawaii requires 130,000 barrels per day of imported crude and products which represent over 90% of its requirements, the maximum supply interruption scenario that was investigated assumes that only 30,000 barrels per day of that imported crude and products will be interrupted under the worst embargo case. It appears that the SPR Plan is set up for the sole purpose of combatting another Arab oil embargo of 1973. And perhaps even in that case it's unrealistic. For even if the traditional sources of most of Hawaii's imported crude, Indonesia and the surrounding area countries, did not participate, it is very likely that their production would be allocated and diverted to other areas. This is particularly true under the treaty obligations for petroleum sharing during an embargo that we have with the other importing nations. However, beyond that we do not believe that Congress intended that the SPR Program was to be set up entirely to fight the last war, in this case the Arab oil embargo of 1973. Rather, the program, to be effective, should be designed to protect us from a variety of embargoes or interruptions scenarios from whatever source, for in fact if any part of the country is left hostage to foreign imports, the United States is still vulnerable. (Reference page 109, table V-5).

REFINED PRODUCTS

The SPR Plan (page 117, paragraph 5) states that there will be no shortage of refined products in noncontiguous areas. However, there is no analysis of the product situation in Hawaii to support this. Specifically, there is no provision for replacing the 23,000 barrels per day of imported jet fuel used in Hawaii.

Again their approach seems to be that this jet fuel will be replaced from the West Coast. However, as we previously pointed out, 300-500,000 barrels a day of crude oil and 130,000 barrels per day of products imported to the West Coast will similarly be affected by an embargo which would affect Hawaii. Further, the increased dependence upon North Slope crude projected by the study will intensify the shortage of jet fuel due to the Quality of the North Slope crude. Consequently the West Coast will have its hands full taking care of itself. Enclosed is an analysis of the requirement for jet fuel storage in Hawaii (Enclosure 3). A portion of the SPR located in Hawaii should be for jet fuel, as proportionately, we have far greater requirements for this fuel.

TRANSPORTATION DURING EMERGENCY

According to the SPR Plan, the shipping of the oil from Strategic Storage is to be left to the petroleum industry (page 164 & 165). This leaves Hawaii's refiners to cope with the problem of finding U.S.-flag vessels that can transit the Canal from the Gulf Coast to Hawaii. The SPR Plan calls for every effort to be made in an embargo to maximize the use of North Slope crude oil. This would put added requirements on the U.S.-flag vessels in the Pacific area. In an emergency, the SPR Plan calls for the Jones Act to be temporarily waived to allow for use of foreign flag ships for transportation between U.S. ports if U.S. ships are not available. The Plan indicated that "there would be virtually no delay in obtaining such a waiver" (SPR Plan pages 122 & 165). Hawaii has had some considerable experience with Jones Act waivers. We have found the government consistently reluctant to grant waivers to the Jones Act for any reason.

Hawaii with its 90% dependence upon Foreign crude oil would probably be the very first area of the United States to be affected by an embargo. While we know that the legal machinery for a Jones Act waiver exists, our past experience indicates that such a waiver will not be obtained until after substantial impact is experienced on the mainland. By the time this occurs, Hawaii would probably have already been severely impacted.

DIVERSION OF CRUDE

The SPR Plan states that in an embargo situation the FEA may be able to divert crude destined for the Gulf or East Coast to the Pacific instead of supplying crude out of the central storage (page 118, paragraph 2). Presumably this refers to diverting low sulphur Nigerian crude from East and Gulf Coast destinations to Hawaii. Presuming that the very special Nigerian crude is available in sufficient quantity and is not affected by an embargo, this does avoid the problem of using U.S.-flag vessels, as foreign flag vessels could be used for such a movement. However, even if these variables come together to allow such a diversion, the additional

shipping costs for moving this crude from East Africa through the Canal to Hawaii is on the order of \$100,000 a day. This \$100,000 a day is over and above what they will already have paid as their fair share of the cost of the Strategic Petroleum Reserve.

CONSIDERATION OF NONCONTIGUOUS AREAS

The Strategic Petroleum Reserve Plan states that they have done "extensive analysis" on the need for storage in noncontiguous areas "considering potential supply interruptions, cost, cost benefit relationships and environmental impact comparisons with central storage" (SPR Plan page 10, paragraph 4; and page 127, paragraph 3). In spite of repeated requests, the FEA has refused to share with the State of Hawaii anything but the conclusions of these studies. The conclusions that they have presented, as pointed out here, often appear to be based on incomplete data or limited analysis. It is also noteworthy that the Final Environmental Impact Statement for the Strategic Petroleum Reserve Program published in December of 1976 almost completely ignores noncontiguous areas. A review of the Plan leads us to conclude that noncontiguous areas have not been given adequate study, and that the statements made in the SPR Plan are at best inconclusive.

HAWAII'S PROPORTIONAL SHARE

The SPR Plan states that since Hawaii has only 1% of the nation's refinery capacity, therefore at the most we would only be entitled to 1% of the Strategic Petroleum Reserve, or 5 million barrels of storage (page 130, paragraph 7). In fact, a more proper measure of Hawaii's size for Strategic Petroleum Storage, and a measure more consistent with the intent of the Joint Congressional Conference, would account for the percentage dependence on foreign crude oil. The United States is dependent upon foreign crude oil and products for 40-50 percent of its petroleum supply. To allocate to Hawaii only its proportion of total national demand is to assume that Hawaii also is only 40 to 50 percent dependent on foreign crude oil. The varying dependence on foreign crude oil among areas of the U.S. is a function of minimizing the cost of transporting crude oil.

The FEA encourages this optimization of the transportation system through its crude equalization program by which the cost of crude for refineries, regardless of whether they are using domestic or foreign crude, is roughly equalized. Two percent of the nation's foreign crude supply is imported into Hawaii. By this measure, Hawaii logically should receive 2 percent of the Strategic Petroleum Reserve, or roughly 10 million barrels of storage.

CONCLUSION

The Strategic Petroleum Reserve Plan submitted to Congress is in our view based on erroneous facts and/or improper analysis of the facts. We see no reason to conclude that there will be unacceptable "environmental hazards" associated with establishing a component of the SPR in Hawaii. Further, when the full system cost of delivering crude to Hawaii is considered, storing crude in Hawaii is less costly. The storage plan recommended by the SPR Plan shifts the legitimate costs of the Strategic Petroleum Storage Program to the people of Hawaii in the form of increased shipping rates. This is discriminatory in the very sense that Congress warned against. The SPR Plan may be characterized as providing for Hawaii's needs in an embargo with an unknown quantity of an unknown crude or product coming from an unknown port in unknown vessels. This is not an acceptable plan. It does not provide for the security of Hawaii's essential energy needs.

The installation of a component of the SPR in Hawaii is not only practicable, it is cost effective and most responsive to the SPR objectives. We request therefore that the Congress restate to the FEA its desire to have a portion of the Strategic Petroleum Reserve in Hawaii. We further request that the planning and programming for this storage begin immediately and be pursued with dispatch as the SPR Program EIS estimates it will take two to four years to complete the first tank and an incredible seven years to complete a 10 million barrel module! (Reference SPR, EIS, page III-108).

ANALYSIS OF SPR SYSTEM COST

Estimated cost of facilities and transportation for the initial fill and one cycle of withdrawal and refill. According to the Bayou Choctaw Salt Dome EIS, page 1-32, the SPR plan is based on five fill and withdrawal cycles.

A. U.S. gulf coast—Salt dome storage

	<i>Cost per barrel</i>
1. Deliver Indonesian crude to gulf coast for initial fill (70,000 dwt tankers through canal at WS-75)-----	2. 01
2. Lightering and handling for initial fill (SPR p. 106)-----	. 64
3. Salt dome storage (SPR p. 106)-----	2. 24
4. Withdraw SPR crude for shipment to Hawaii including lightering to tanker (estimated)-----	. 30
5. Deliver SPR crude to Hawaii (70,000 dwt U.S.-flag tankers through canal at AR-150)-----	3. 26
6. Deliver Indonesian crude to gulf coast to refill storage (70,000 dwt tanker through canal at WS-75)-----	2. 00
7. Refill (SPR p. 106)-----	. 19
Total-----	10. 65

B. Hawaii—Steel tank storage

1. Deliver Indonesian crude to Hawaii (100,000 dwt tankers at WS-55)---	\$0. 63
2. Initial fill (estimated)-----	. 10
3. Steel tank storage (SPR p. 106) ¹ -----	8. 00
4. Withdrawal to local users (SPR p. 106)-----	. 10
5. Deliver Indonesian crude to Hawaii for refill (70,000 dwt tankers at WS-75)-----	. 63
6. Refill cost (estimated)-----	. 10
Total-----	9. 56

¹ The SPR plan estimates range from \$8 to \$12 per barrel. The lower estimate is taken as a conservative figure based on data provided by the State of Hawaii indicating a cost of \$7 per barrel.

C. Savings associated with establishing a 10 million barrel component of the SPR in Hawaii

10 million barrels $\times$ (10.65 - \$9.56) = \$10.9 million.

Total cost of SPR program—\$8 to \$9 billion.

ANALYSIS OF JET FUEL STORAGE

Purpose

Estimate need for Jet Fuel Storage to cover Hawaii for 90 days.

Assumptions

1. Demand for jet fuel is the same as 1976, 42,000 BPD.
2. All imports of jet fuel are embargoed.
3. Both refineries in Hawaii continue to operate during embargo period at full capacity producing their normal slate of jet fuel for Hawaii.
4. Inventory levels at the start of the embargo equal average 1975 levels.

Analysis

90-day supply with a minimum level of 10 days in tanks equals:	<i>Barrels</i>
100 $\times$ 42,000 barrels per day-----	4, 200, 000
Less refinery production: 90 days $\times$ 19,000 barrels per day-----	1, 710, 000
Shell, SOCAL, Texaco, and Union ¹ -----	547, 000
HIRI ² -----	129, 116
Storage required-----	1, 813, 884

¹ Supplied to FEA by State of Hawaii, Energy Office.

² Data supplied to FEA by HIRI letter of October 1, 1976.

FACT SHEET—ARGUMENTS POSITED BY FEA AGAINST STORAGE IN HAWAII AND RESPONSES

1. *Argument.* Hawaii's refineries export much of their product to the mainland.
 Rebuttal. We do "export" some products to the West Coast. If this is stopped, the West Coast will be short those products in addition to their direct foreign imports which fill on the order of 19-24% of their demand. Also if Hawaiian refineries cease exports, their product balance will be upset and they may be forced to curtail operations drastically.

One of the goals of the SPR Plan is "to maintain refinery supply relationships with users" (See page 40, paragraph 1 of SPR Plan).

2. *Argument.* Hawaii's sources of imported crude will not be interrupted anyway.
 Rebuttal. How can we be so sure? Interruption of imports from just one country (Indonesia) could seriously upset Hawaii and the whole West Coast. Further, with the International Energy Program (IEP), we must share imports with other nations. This agreement wasn't in effect during the 1973 embargo.

3. *Argument.* The Hawaiian refineries can use North Slope crude; they should install hydrodesulfurization facilities so that they can do so.

Rebuttal. There are only two refineries out of 49 refineries on the West Coast which have the capability to desulfurize residual fuel oil. We already pay 5 to 10 cents a gallon more for products in Hawaii than anywhere else in the United States. We cannot afford to handicap ourselves further by installing hydrodesulfurization facilities. Estimates made in the FEA North Slope crude study indicate it would cost each of our Hawaiian refineries from 34-180 million dollars to install hydrodesulfurization facilities. The lowest estimate is more than the initial cost of either of the refineries. Ref: N. Slope Crude Study, 8 Oct. 76, page 63-66.

4. *Argument.* Hawaii's requirements are so small they can be served by the West Coast (Standard Oil of California).

Rebuttal. If Hawaii loses its source of imported fuel, it is very likely that the West Coast will lose theirs, as our imports come from the same countries. The West Coast could lose over 20% of their fuel supply. Therefore, there will be no excess of refinery capacity which can handle high sulfur crudes on the West Coast. Further, we have seen no indication that Standard Oil of California is willing to mothball a part of their capacity and designate it for the use of Hawaii during an embargo.

5. *Argument.* Land is so valuable in Hawaii, how can you spare 120 acres for Strategic Petroleum Reserve?

Rebuttal. The sites we have suggested for Strategic Petroleum Reserves are in a military/industrial area 20 miles from Honolulu. The specific sites are vacant and covered with brush. Energy is so vital to Hawaii that we can't afford not to provide the land for Strategic Storage. The cost that the State used in its evaluation of the economics of steel tankage allowed \$1.00 a barrel for land costs. This amounts to over 10 million dollars for 120 acres of property. This is adequate for the type of property under consideration. Ref: SPR Pacific Area (State of Hawaii), Aug. 76; State Testimony Encl. 1.

6. *Argument.* A portion of the Strategic Petroleum Reserve may be stored in the new refinery/petrochemical complex proposed to be built on Palau. This could service Hawaii.

Rebuttal. Palau is 4,600 miles from Hawaii. This would be the equivalent of storing the Strategic Petroleum Reserves for New York in Istanbul.

7. *Argument.* The difference between the cost of steel tanks and salt domes is so great you can't possibly justify steel tanks.

Rebuttal. The State's analysis of the economics used the FEA's low estimate of the cost of steel tanks (\$8.00/BBL). Use of the lowest FEA estimate was justified by independent evaluation of the Hawaii situation. When transportation costs are included, it is still cheaper to put the storage in Hawaii after just one cycle of use. The FEA based its analysis on five cycles of use, but neglected all transportation costs. The cost of the storage container fades to minor significance as the transportation costs mount. Ref: State's Testimony Encl. 1; See Ironton Mine EIS, Dec. 76, page 2.3-8 and 2.3-10 for discussion of five cycles and exclusion of transportation costs.

8. *Argument.* The Strategic Petroleum Reserve that Hawaii is asking for is really to support only Hawaiian Independent Refinery.

Rebuttal. We have two refineries in Hawaii, one owned by a major oil company and one by an independent. The crude oil portion of the Strategic Petroleum Reserve which Hawaii proposes would serve both of these refineries. 20 percent of

the reserve should be put in jet fuel. This portion of the storage will serve neither refinery. Lest we lost sight of the facts, we might point out that the SPR Plan submitted to Congress proposes the development of Strategic Petroleum Reserves in two mines where according to the plan "the sole recipient would be the Ashland refinery." These sites will hold over 35 million barrels of crude oil, more than 4 times the crude storage requested for the State of Hawaii. Ref: SPR Plan, page D-18 for reference to Ashland refinery; SPR Pacific Area (State of Hawaii), Aug. 76, page 2, for Hawaii's SPR recommendations.

9. *Argument.* The environmental hazards would be too great in Hawaii.

Rebuttal. We can suggest few things that would effect the environment of Hawaii's people more than an energy shortage. Further, the oil spill hazard is significantly reduced by storing in Hawaii. For example, comparing the oil spill hazard of direct delivery to Hawaii vs delivery to the Bayou Choctaw Salt Dome then shipping to Hawaii, the oil spill hazard is 3 to 30 times greater using the Salt Dome. Based on page 226 of the SPR Plan, the expected spills for 10 million barrels are as follows:

	<i>Expected spill (gallons)</i>
Thru Bayou Choctaw to Hawaii-----	3, 600-36, 000
Direct to Hawaii-----	1, 200

FACT SHEET—STRATEGIC PETROLEUM RESERVES

BACKGROUND

On December 15, 1976, the FEA forwarded its Strategic Petroleum Reserve (SPR) Plan to Congress for approval. Even though Congress specified in the Energy Policy and Conservation Act of 1975 that "to the maximum extent practicable" each non-contiguous area of the United States is to have its own component of the reserve, the plan makes no provision for a component of the storage in Hawaii. All of reserve is to consist of crude oil stored in the U.S. Gulf Coast area. In the event of an emergency, the SPR Plan calls for the FEA to satisfy the energy needs of the nation using this central crude reserve and a nationwide crude and products allocation program. The following are the salient points of the FEA position on Hawaii:

1. No storage was recommended in Hawaii because of the undesirable "environmental hazards." (SPR Plan page 10, paragraph 5 and page 131, paragraph 2).

Comment.—There has been no FEA study of the environmental effects of storage in Hawaii to support this conclusion. We question the environmental wisdom of the additional shipping and handling required for Gulf Coast storage with its attendant increased potential for oil spills and air emissions.

2. The FEA says that the cost of steel tankage in Hawaii is \$10.57/bbl as against \$2.24/bbl for salt dome storage in the Gulf Coast (SPR Plan, page 127, paragraph 4).

Comment.—The cost of storage alone is not a proper criteria for an economic comparison of the sites. The total system cost needs to be evaluated including the transportation charges which are very significant. The State has provided estimates, with independent back up data, to indicate that storage may be constructed in Hawaii for \$7.00 per barrel. Further, when the full system cost is developed, including transportation, the cost of storage in Hawaii is actually less expensive (See enclosed analysis).

It should also be noted that this is a one-time fill, use and refill cost. If the reserve is used more than once, the transportation cost advantage of the Hawaii location becomes increasingly significant.

3. FEA says Hawaii will have "nondiscriminatory" access to Gulf Coast reserves (SPR Plan, page 98, paragraph 3).

Comment.—Who but Hawaii will have to ship the petroleum 6,000 miles from the Gulf Coast to Hawaii, assuming the Panama Canal is operable? This will cost Hawaii's population at least \$3.22 per barrel or 8 cents per gallon, if we can find the ships to haul it!

4. FEA says Hawaii will be supported by diversion of crude and products from the West Coast (SPR Plan, page 114, paragraph 3 and 6, page 118, paragraph 2).

Comment.—A recently published FEA study on the disposition of Alaskan crude concluded that the West Coast will continue to use 300,000-500,000 barrels per day of imported crude and an additional 130,000 barrels per day of imported products in 1980 and beyond. This means the West Coast is dependent upon

imports for 19-24 percent of its petroleum supply. These imports come from the same areas that supply imports to Hawaii. If these sources of supply are cut off, how can Hawaii expect help from the West Coast?

5. FEA says their analysis shows that crude inventories and shipments in transit provided sufficient supply endurance to continue normal refinery runs until crude replacements from the SPR could reach refinery centers" (SPR Plan, page 117, paragraph 6).

Comment.—Hawaii's refineries each have more than 30 days of crude supply on hand and en route. This exceeds the 26 days average inventory for all West Coast refineries which undoubtedly includes production and pipeline storage. (See SPR Plan page 115, paragraph 3) Using figures from page 116 of the SPR Plan, it will be approximately 63 days before crude can be delivered to Hawaii from central storage assuming we can find the U.S. flag tankers, the Panama Canal is open and we are ready to pay the 8 cents per gallon freight cost. Allowing a 10-day minimum inventory, this leaves a gap of 43 days during which Hawaii's refineries may be without crude oil.

6. Although the SPR Plan reports that the Pacific, including Hawaii requires 130,000 BPD of imported crude, over 90 percent of its requirement, the maximum supply interruption investigated by FEA assumed 100,000 BPD of imported crude would continue to be delivered to Hawaii. (SPR Plan, Page 109, Table V-5).

Comment.—The numbers used by the FEA in their analysis are completely unrealistic. It appears that the whole plan is set up to combat another Arab oil embargo. If the crude and products being supplied to the West Coast and Hawaii are interrupted for whatever reason, or this crude and product is diverted to replace Arab crude, the whole plan will fall apart and Hawaii will bear the brunt.

7. FEA asserts that there will be no shortage of refined products in non-contiguous areas. (SPR Plan, page 117, paragraph 3)

Comment.—There is no analysis of the jet fuel situation in Hawaii to support this—nor is there any provision for replacing the 23,000 b/d imported. Our analysis indicates a shortfall of 1.8 million bbls within 90 days (see attached analysis).

8. FEA says by 1980 only 70,000 barrels per day of the West Coast 2,600,000 barrels per day demand will be imported crude. (SPR Plan, page 114, paragraph 2).

Comment.—This is in conflict with the recently published FEA study of the disposition of Alaskan crude. According to that study, the West Coast will be utilizing 300,000-500,000 barrels per day of imported crude in 1980 and beyond. This represents 12-19% of the total West Coast demand. Imported products will account for another 130,000 barrels per day or 5 percent of the demand making the West Coast 17-24 percent dependent upon imports in 1980. They will not be in a position to help Hawaii if imports are interrupted. (Ref page 135 of "North Slope Crude—Where to?—How")

9. Shipping of the crude oil from Strategic Storage is to be left to the petroleum industry. (SPR Plan, page 164 & 165).

Comment.—This leaves the problem of getting vessels that can transit the Canal to Hawaii's refiners and the cost (estimated in the vicinity of 8¢ per gallon) to be paid by the customers of Hawaii's refineries. According to the FEA, this satisfies the Congressional mandate to provide equitable and nondiscriminatory access to SPR for non-contiguous areas!

10. In an emergency it is planned that the Jones Act would be temporarily waived to allow the use of foreign flag ships for transportation between U.S. ports if U.S.-flag ships are not available. We are advised that "there would be virtually no delay in obtaining such a waiver". (SPR Plan, pages 122 and 165)

Comment.—Hawaii has some experience with Jones Act waivers. With Hawaii's unique vulnerability to a petroleum interruption, we are likely to be the first area hurt. We doubt that a Jones Act waiver will be granted until *after* we are hurt.

11. FEA says they may divert crude destined for the Gulf or East Coast to the Pacific instead of supplying out of the SPR. (SPR Plan, page 118, paragraph 2)

Comment.—Presumably this means diverting Nigerian crude from the East Coast which would be usable to Hawaii. This would cost Hawaii approximately \$100,000/day in added shipping cost over normal supply. Again, this assumes we can find ships and transit the Canal.

12. The FEA says that since Hawaii has only 1% of the nation's refinery capacity, we would only be entitled to 1% of the SPR or 5 MM bbls. (SPR Plan, page 130, paragraph 7)

Comment.—A more proper measure of the need would be based on the nation's refinery capacity dependent upon imported crude. By that measure, Hawaii is entitled to 2% of the SPR or 10 MM bbls.

13. The FEA states that it has done "extensive analysis" of the need for storage in non-contiguous areas "considering potential supply interruptions, cost, cost-benefit relationships & environmental impact comparisons with central storage." (SPR Plan, page 10, paragraph 5, & page 127, paragraph 3)

Comment.—In spite of repeated requests, the FEA has refused to share with the States anything but the conclusions of their studies.

CONCLUSION

The Strategic Petroleum Reserve Plan submitted to Congress is based on erroneous facts and/or improper analysis of the facts. We see no reason to conclude that there would be unacceptable "environmental hazards" associated with establishing a component of the SPR in Hawaii. Further, when the full system cost of delivering crude to Hawaii is considered, storing crude in Hawaii may be less costly. The storage plan suggested by the FEA shifts the legitimate costs of the strategic storage program to the people of Hawaii in the form of increased shipping rates. This is discriminatory in the very sense that Congress legislated against. Aside from these issues, the plan does not provide for the security of Hawaii's essential energy needs and is, therefore, totally unacceptable.

Enclosures:

1. Analysis of SPR system cost, 15 December 1976.
2. Analysis of JFT fuel storage, 15 December 1976.
3. Specific Discussion of Hawaii, SPR Plan, page 130.

ANALYSIS OF SPR SYSTEM COST

Estimated cost of facilities and transportation for the initial fill and one cycle of withdrawal and refill. According to the Bayou Choctaw Salt Dome EIS, page 1-32, the SPR plan is based on five fill and withdrawal cycles.

A. U.S. Gulf Coast—Salt Dome Storage

	Cost per barrel
1. Deliver Indonesian crude to Gulf Coast for initial fill (70,000 dwt tankers through Canal @ WS 75)-----	\$2. 01
2. Lightering & handling for initial fill (SPR Page 106)-----	. 64
3. Salt Dome Storage (SPR Page 106)-----	2. 24
4. Withdraw SPR crude for shipment to Hawaii including lightering to tanker (Estimated)-----	. 30
5. Deliver SPR crude to Hawaii (79,000 dwt U.S.-flag tankers through Canal @ AR 150)-----	3. 26
6. Deliver Indonesian crude to Gulf Coast to refill storage (70,000 dwt tanker through Canal @ WS 75)-----	2. 00
7. Refill (SPR Page 106)-----	. 19
Total-----	<u>10. 65</u>

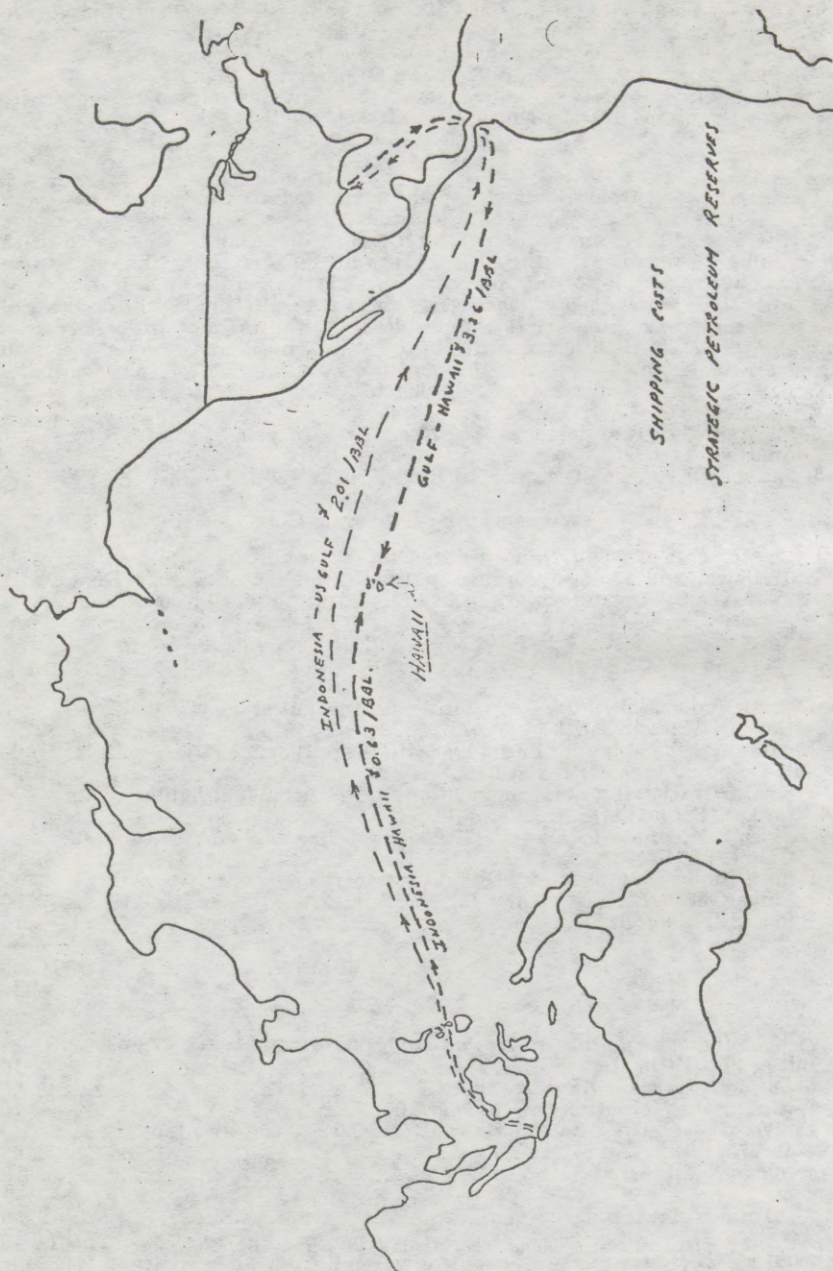
B. Hawaii—Steel Tank Storage

1. Deliver Indonesian crude to Hawaii (100,000 dwt tankers @ WS 55) --	. 63
2. Initial Fill (Estimated)-----	. 10
3. Steel tank storage (SPR Page 106) ¹ -----	8. 00
4. Withdrawal to local users (SPR Page 106)-----	. 10
5. Deliver Indonesian crude to Hawaii for refill (70,000 dwt tankers @ WS 75)-----	. 63
6. Refill cost (estimated)-----	. 10
Total-----	<u>9. 56</u>

¹ The SPR plan estimates range from \$8 to \$12 per barrel. The lower estimate is taken as a conservative figure based on data provided by the State of Hawaii indicating a cost of \$7 per barrel.

C. Savings associated with establishing a 10 million barrel component of the SPR in Hawaii

10 million barrels × (\$10.65 - \$9.56) = \$10.9 million. Total cost of SPR program—\$8 to \$9 billion.



ANALYSIS OF JET FUEL STORAGE

Purpose

Estimate need for Jet Fuel Storage to cover Hawaii for 90 days.

Assumptions

1. Demand for jet fuel is the same as 1976, 42,000 BPD.
2. All imports of jet fuel are embargoed.
3. Both refineries in Hawaii continue to operate during embargo period at full capacity producing their normal slate of jet fuel for Hawaii.
4. Inventory levels at the start of the embargo equal average 1975 levels.

Analysis

	Barrels
90-day supply with a minimum level of 10 days in tanks equals:	
100×42,000 BPD-----	4, 200, 000
Less refinery production: 90 days×19,000 BPD-----	-1, 710, 000
Less average jet fuel inventory:	
Shell, SOCAL, Texaco, and Union ¹ -----	-547, 000
HIRI ² -----	-129, 116
Storage required-----	1, 813, 884

¹ Supplied to FEA by State of Hawaii, Energy Office.

² Data supplied to FEA by HIRI letter of October 1, 1976.

PROBABLE FEA ARGUMENTS AGAINST HAWAII

FEA—*Standard Oil of California has 400,000 barrels of new capacity on the West Coast which can handle the North Slope crude and which is not being used. This new capacity can provide products for Hawaii.*

Comment—The FEA North Slope Crude Study fully took into account all of the capacity on the West Coast and concluded that the West Coast would still be importing 300-500,000 barrels a day of crude and 130,000 barrels per day of products in 1980. This high sulfur capacity will be needed to fill the import gap on the West Coast. Even if this capacity were available, the quality of North Slope crude is such that the production of residual fuel oil would be extremely high and the production of jet fuel very low. This is exactly the opposite of Hawaii's needs. Further, it's not reasonable to think that Standard Oil is going to maintain this capacity in mothballs until we are ready to use it. It hardly makes sense to shut down an independent refinery in Hawaii so that we can take a Standard Oil refinery out of mothballs on the West Coast. Products then have to be shipped in scarce U.S. bottoms to Hawaii.

FEA—*The Hawaiian refineries maintain too low a crude inventory. They should increase their stocks of crude oil. The independent refinery maintains a lower inventory than the Standard Oil of California inventory.*

Comment—Both refineries in Hawaii maintain about 30 days worth of crude inventory on hand and in transit. This is higher than the 26-day inventory maintained on the West Coast. It is not reasonable to expect these refineries, which must compete with West Coast refineries, to maintain higher inventories. Records of the State of Hawaii's energy office indicates that both the refineries maintain very similar inventory levels. We concur that higher inventory levels are required to protect Hawaii and that is what the Strategic Storage Program is all about.

FEA—*Hawaii's requirements are so small that they can be serviced from the West Coast without any problems.*

Comment—Hawaii's requirements are small compared to the total. For this reason they are often overlooked. If we cannot get the attention of the government during these normal times to see our need for Strategic Petroleum Reserves and fulfill them, then how can we expect to get the government to make Jones Act exemptions and divert products specifically for Hawaii in times of emergency? The fact is that during an emergency, Hawaii will be the first to be affected as we are over 90% dependent upon imported petroleum.

FEA—*Hawaii overreacts to shortages in any case.*

Comment—While the FEA may feel that Hawaii overreacts, we must remind you Hawaii is further from Los Angeles than is Washington. We have no natural gas pipelines, we have no crude or product interstate pipelines nor do we have any electrical interties. Unfortunately a 2,000 mile extension cord hasn't been invented yet.

FEA—*Hawaii gets most of its crude from the Asia-Pacific area (Indonesia) and those are secure sources.*

Comment—We do get a good portion of our imports from the Indonesian area; however, these are the same sources that also supply much of the imports to the U.S. West Coast. However, even if an Arab oil embargo did not effect Indonesian sources, certainly Indonesian crude oil would be allocated around the world to fill the void left by Arab crude. These international sharing agreements were not in effect at the time of the 1973 embargo. Further, the Strategic Storage Plan is to be designed to protect us from any interruption in our energy supplies. To design this plan merely to protect us against an Arab oil embargo is like preparing to fight the last war.

FEA—*If we put all the Strategic Storage in the Gulf Coast where we have the lowest containment cost, we can buy more oil and give more protection to everybody.*

Comment—We concede that you can store oil more in the Gulf Coast if you don't consider all the costs. However, this is like buying shoddy goods and then finding your savings are eaten up in maintenance. However, in this case, the way the SPR Plan is designed, those extra costs will be passed on to Hawaii in the form of shipping costs. In effect, the legitimate costs of the Strategic Storage Program will be passed on to the people of Hawaii. Nothing could be more discriminatory.

FEA—*Shipping ten million barrels of oil to Hawaii and storing it there is environmentally unsound.*

Comment—This is nonsense. We handle more than 4 times that much oil every year in the State of Hawaii now. There's little that would impact upon the environment of the people of Hawaii more than an energy shortage. It could take their jobs, deny them basic utility service, in short, ruin the whole economic fabric of the state.

FEA—*Shutting down Hawaii's refineries will have little impact upon the islands as long as product needs are supplied.*

Comment—If Hawaii is to build a viable industrial base, it certainly cannot be done on the premise that in an emergency it will be shut down and all its markets, in Hawaii and on the mainland, will be served by mainland companies. It is discriminatory to use tax money to provide security for mainland industry and plan to shut down Hawaii's industry.

FEA—*Other areas, such as the State of Washington, would have problems similar to Hawaii.*

Comment—There is little similarity. The State of Washington has interstate natural gas pipelines, crude and product pipelines, hydroelectric power and coal.

FEA—*Hawaii is including military fuel requirements.*

Comment—Normal military fuel requirements are included as part of the domestic demand throughout the SPR Plan. If we don't consider normal military usage, then the military must fall back on War Reserves. This is unrealistic.

FRANK SKRIVANEK
Deputy Director

STRATEGIC PETROLEUM RESERVES, PACIFIC AREA

As the United States continues to increase its dependence upon foreign supplied crude oil and products, the need to implement the Strategic Petroleum Reserve Program provided for in the Energy Policy and Conservation Act of 1975 becomes increasingly critical. This mid-Pacific area, with its almost complete dependence upon foreign crude oil and products for energy which is the lifeblood of our economic well-being, is particularly vulnerable to an embargo or other emergency which interrupts normal petroleum trade. The Energy Policy and Conservation Act specifically took note of this unique situation in non-contiguous areas and provided "to the maximum extent practicable, that each noncontiguous area of the United States which does not have overland access to domestic crude oil production has its component of the Strategic Petroleum Reserve within its respective territory."

Accordingly, we have undertaken a study of the energy supply situation in Hawaii to assess our needs for Strategic Petroleum Reserves. The results of this study are outlined in the two concept papers enclosed. In summary, we found Hawaii to be the hub of the mid-Pacific area. A detailed analysis indicates that 90% of the feedstocks for Hawaii's two refineries are supplied from foreign sources. In addition, 85% of the finished products brought into Hawaii come directly from foreign sources. The Strategic Petroleum Reserves Program is far more critical to Hawaii than it is to the Mainland States. A nationwide 20% cut in petroleum supply would decrease the Mainland's total energy supply by only 8.9%. If other sources of energy can be substituted, the actual shortage is even less. By contrast, a 20% cut in petroleum supplied to Hawaii would result in very nearly a full 20% energy shortage. Hawaii must have its own component of the Strategic Petroleum Reserves as provided in the Act.

An emergency strategy based solely on replacing foreign crude oil lost to an embargo with Alaskan North Slope crude is not viable. The products produced using North Slope crude would not meet required quality or environmental specifications. An emergency strategy utilizing Strategic Petroleum Reserves to supplement the substitution of Alaskan North Slope crude, which will be used to the maximum extent possible, is feasible, assuming a national strategy can be developed which will assure the availability of Alaskan North Slope crude in an emergency. This strategy will minimize the quantities to be stored under the Strategic Storage Program.

The storage of crude alone will not meet the area's exceptionally high requirement for jet fuel. Consequently, part of the storage must be dedicated to jet fuel. The minimum quantities recommended for storage under the Strategic Petroleum Reserves Program are as follows:

	Barrels
Seria Crude (Brunei)	4, 770, 000
Sumatran Lt. Crude (Indonesia)	3, 060, 000
Jet Fuel (JP-5)	2, 070, 000
Total	9, 900, 000

Under a full embargo on foreign crude and products, this strategic storage together with the diversion of an additional 16,000 barrels per day of Alaskan North Slope crude to Hawaii and a demand restraint equal to 6% on all products would provide approximately 90 days supply protection as envisioned under the Act.

The logical location for this storage, considering the existing terminal and pipeline systems, is the Pearl Harbor-Barber's Point Area. A number of potential storage sites which meet federal site selection criteria have been identified. The capital cost of the strategic storage facility is estimated at approximately \$70,000,-000-\$7.00 per barrel of storage.

The State of Hawaii is ready to assist the FEO in developing this program. Hawaii fills a unique position in the defense posture of the United States and a viable civilian economy is certainly important to the military, as noted in the enclosed letter from the Commander-in-chief Pacific, Admiral Gayler. Creation of this storage in Hawaii as envisioned by the Act is critical to our economic future. The 10 million barrels of storage requested for this mid-Pacific area is only 2% of 500 million barrels of strategic Storage to be created for the nation. Certainly this is not a disproportionate share in view of our unique position.

Enclosures:

1. CINCPAC letter
2. Concept Paper—Strategic Petroleum Reserve, Pacific Area, March 1976
3. Concept Paper—Strategic Petroleum Reserve, Pacific Area Storage Requirements, August 1976
4. Facility Cost Estimate, August 1976.
5. Crude Shipping Data, August 1976

COMMANDER IN CHIEF PACIFIC,
July 6, 1976.

Hon. GEORGE R. ARIYOSHI,
Governor of Hawaii,
Hawaii State Capitol, Honolulu, Hawaii.

DEAR GEORGE: Thank you for your letter of 9 June 1976 regarding the Federal Energy Administration (FEA) plan to establish a bulk petroleum stockpile.

I am aware of the work in the Congress and FEA to establish reserve petroleum stocks to reduce the impact of fuel shortage should another embargo or other supply disruption occur.

I endorse your efforts to obtain a portion of the proposed 150-million barrel reserve for storage in Hawaii. Adequate availability of petroleum products is obviously essential if our military forces in the Pacific are to be maintained in a state of readiness.

Sincerely,

NOEL GAYLER,
Admiral, U.S. Navy.

MARCH 1976.

STRATEGIC PETROLEUM RESERVE, PACIFIC AREA

BACKGROUND

Because of almost complete dependence upon petroleum fuels and lack of viable alternate energy sources at least in the short run, the islands of the Pacific are particularly vulnerable to interruptions in delivery of crude oil and petroleum products resulting from embargoes or other emergencies. Energy shortages severely impact the Pacific Area causing unemployment, inflation, economic dislocations and hardships. They disrupt foreign and domestic commerce and threaten national security.

The federal "Energy Policy and Conservation Act" of 22 December 1975 provides for the establishment of a Strategic Petroleum Reserve (Sec. 151-166). The law specifically provides "to the maximum extent practicable, that each noncontiguous area of the United States which does not have overland access to domestic crude oil production has its component of the Strategic Petroleum Reserve within its respective territory". (Sec. 154) This paper briefly outlines some concepts for the establishment of the physical facilities required to serve the noncontiguous Pacific area.

RESERVE LOCATION

The area to be served by this component of the Strategic Petroleum Reserve is Hawaii, Guam, American Samoa, U.S. Possessions and U.S. Trust Territories of the Pacific. Hawaii is the hub of this area, the major energy user in the area and the major supplier through civilian or military channels to much of the area. Three petroleum refineries exist in this area. The two largest are located in Hawaii.

Refineries:

Hawaiian Independent Refinery, Inc., Barbers Point, Oahu, Hawaii	59, 000	BPCD
Standard Oil of California, Barbers Point, Oahu, Hawaii	40, 000	
Guam Oil & Refining Company, Apra Heights, Guam	29, 500	

The most logical location for the major portion of the Strategic Petroleum Reserve for the Pacific area is Hawaii; however, it may be desirable to establish some portion of the reserve in Guam.

This paper will hereafter deal only with recommendations concerning the Strategic Petroleum Reserve Storage to be located in Hawaii.

SIZE OF RESERVE

Hawaii's current energy balance is as follows:

	Barrels
Imports:	
Foreign Crude.....	104, 000
Domestic Feedstocks.....	11, 000
Domestic Product.....	5, 000
Foreign Product.....	30, 000
Total.....	150, 000
Exports:	
Products to Domestic Users.....	28, 000
Products to Pacific area.....	5, 000
Total.....	33, 000
Consumed in Hawaii.....	117, 000

Analysis of the above indicates that 90 percent of the feedstocks for Hawaii's refineries and 86 percent of the finished products brought into Hawaii come directly from foreign sources.

Based on the above, if we are to provide strategic storage in such a manner that in the event of an interruption of foreign supplies normal product patterns are to continue, and we assume that provisions are made for current U.S. mainland suppliers to likewise continue their shipments to Hawaii; provisions must be made to replace 104,000 BPD of crude supply and 30,000 BPD of foreign product.

Alternately we could assume that Hawaii must operate in isolation, that is sufficient storage is to be provided in order that Hawaii will be able to meet its own day-to-day needs, but not fulfill the needs of those traditionally dependent upon Hawaii for supply. This system has the additional complication of requiring conversion of existing refineries, which are geared to providing products for the current distribution system, to provide the specific products needed by the Hawaiian market. It also requires additional consideration be given to providing, by some other means, for the U.S. markets currently supplied from Hawaii.

For this paper it is assumed the first system will prevail, i.e., insofar as possible, normal distribution patterns are to be maintained.

After careful consideration of the various alternatives, a strategy for combating an embargo on foreign crude and products has been developed consisting of three elements.

1. Actions to restrain demand approximately 6% on all products.
2. Substitute Alaskan North Slope crude for foreign crude to the extent feasible.
3. Strategic storage to fill remaining need for refinery feedstock and jet fuel.

The total strategic storage requirement for 90 days protection based on this strategy is approximately 10 million barrels. (See Concept Paper—Storage Requirements for details).

STORAGE SITES

Selection criteria for storage sites include:

1. Accessibility to existing marine terminal facilities.
2. Accessibility to existing refineries in the case of crude storage and product distribution systems, or users in the case of products.
3. Minimum site cost; perhaps government-owned property.
4. Site security, i.e., protection from terrorist activity.
5. Sufficient property available to provide adequate dispersion of facilities for fire protection.
6. Sufficient property available for future expansion if required.
7. Environmentally suitable site, i.e., minimum risk from natural elements and compatibility with environment.
8. Minimum operating cost, including consideration of provisions for rotation of stocks to prevent deterioration and the availability and cost of utilities.
9. Minimum construction cost.

Based on the above criteria, the logical location for the crude storage is in the vicinity of Barbers Point, Oahu. The additional product storage could also be located in the vicinity of Barbers Point, or alternately in an area between Barbers Point and Hickam AFB with access to the pipelines in the State of Hawaii's Energy Corridor. Information available indicates military storage capacity in Hawaii is required for current operations and for Prepositioned War Reserves (PWRs) for the Pacific Area and cannot be considered for this use.

The minimum area required for the 90-day storage is in the vicinity of 125-200 acres. Several sites which singly or in combination appear to meet the above criteria are shown on the enclosed photo map. Detailed study is required to evaluate the availability and relative merits of these sites plus any others developed as a result of additional study.

PROGRAM TO ASSIST FEA

The Hawaii State Department of Planning and Economic Development (DPED) proposes to assist the FEA in preparing the Pacific Area portion of the Strategic Petroleum Reserve Plan through the following program

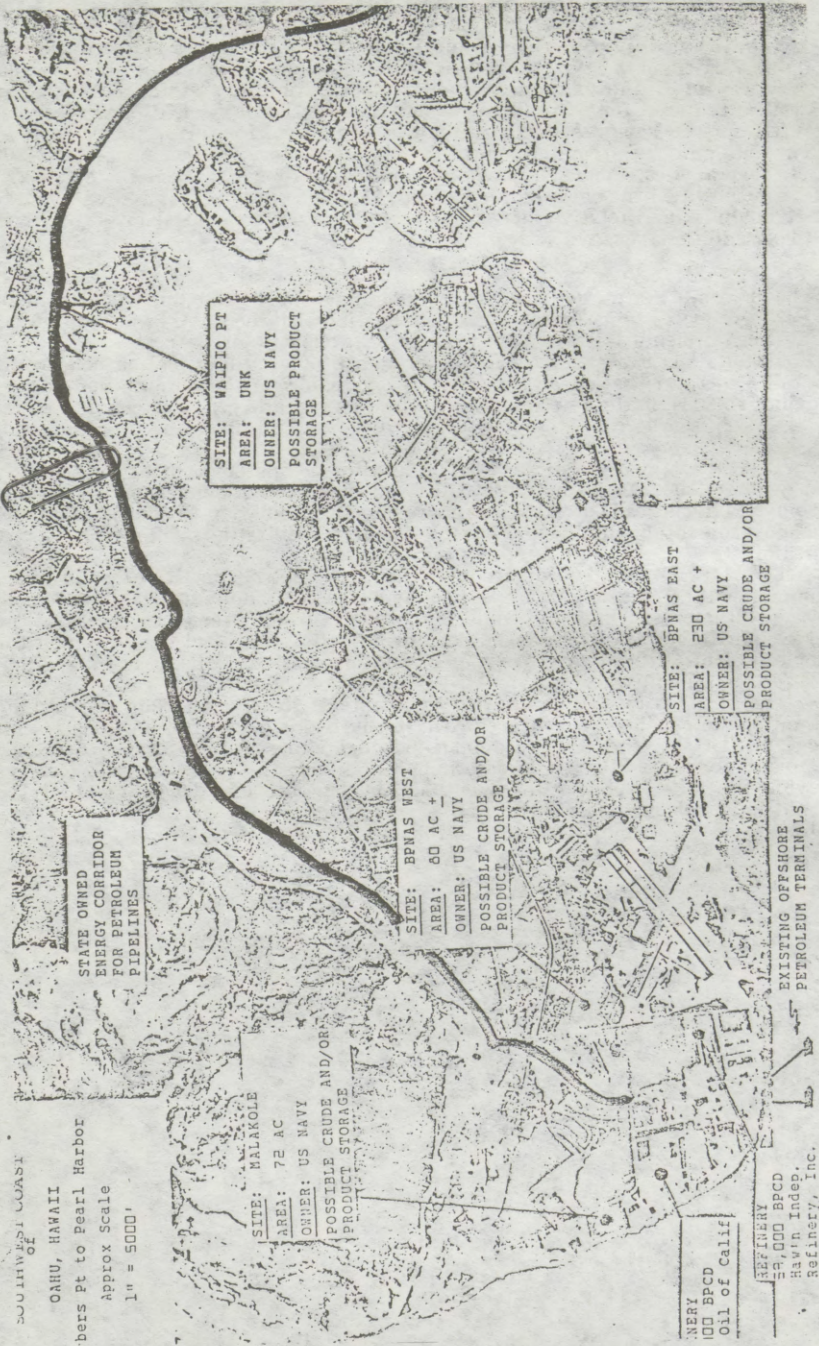
1. The DPED can assist the FEA through providing information concerning Hawaii's energy situation and unique energy requirements. Information can be provided to assist in the determination of the quantity and type crude and products to be stored, selection of storage sites, construction and operating procedures for the storage facility.

2. The DPED can assist the FEA in locating competent contractors to study and evaluate the various potential sites and make recommendations concerning the physical facilities. The DPED can also effect coordination within the state and local governmental planning and existing facilities such as the state-owned Energy Corridor.

3. The DPED can coordinate the Strategic Petroleum Reserve Program planning with emergency conservation and disaster planning of the state and local governments. This is an important aspect of our interest as the Strategic Petroleum Reserve Program has important potential to protect the welfare of the people of Hawaii from several types of contingencies and disasters in addition to a foreign oil embargo.

4. The DPED can coordinate with the Strategic Reserve Office in establishing Hawaii's interest in participating in the Early Storage Reserve portions of this program. To this end it is recommended that site selection for the Strategic Petroleum Reserve Storage be determined and that the Early Storage Reserve provide the initial nucleus for eventual construction and development of the Strategic Petroleum Reserve Storage.

Enclosures: Possible Strategic Petroleum Storage Sites, Hawaii, 5 Feb. 76.



STRATEGIC PETROLEUM RESERVE, PACIFIC AREA STORAGE REQUIREMENTS

BACKGROUND

This study supplements our concept paper of March 1976 which provided an overview of the critical need for locating a portion of the Strategic Petroleum Reserves in the Pacific Area. The concept paper covered the background for Strategic Petroleum Reserves in the Pacific and provided a rationale for locating the Reserves in Hawaii and discussed storage site selection criteria and possible storage sites. This study discusses in more detail what should be stored.

NEED FOR STRATEGIC STORAGE

Hawaii, with its almost complete lack of indigenous energy resources, is highly dependent upon petroleum fuels. The islands are particularly vulnerable to embargoes and other interruptions to supply lines. Hawaii has two domestic refineries, the capacity of which approximates the total fuel requirements of Hawaii. However, the appropriate product mix for Hawaii, which has a disproportionate demand for jet fuel, is attained by a sizable trade with domestic and foreign markets and suppliers. Hawaii exports gasoline and low sulfur residual fuel to the U.S. West Coast and imports jet fuel from foreign refineries.

By virtue of Hawaii's unique location, the crude supply for both Hawaiian refineries is primarily foreign. Approximately 104 thousand barrels per day of foreign crude is shipped to Hawaii for processing. This constitutes 90 percent of the feedstocks for both refineries. Interruption of this supply of foreign crude oil or of the significant quantities of jet fuel imported would severely impact the economy of Hawaii and the entire Mid-Pacific.

In recognition of the severe impact which a disruption in foreign crude or product supply could induce in such noncontiguous areas as Hawaii, the federal "Energy Policy and Conservation Act" of 22 December 1975 provides for the establishment of a portion of the Strategic Petroleum Reserve in such areas. We are concerned, therefore, with how such a reserve may be constituted to meet Hawaii's needs in case such an interruption were to take place.

CRUDE SUBSTITUTION VS. STORAGE

It has been suggested that PAD 5 (which includes the West Coast and Hawaii) has no need for strategic storage as within a few years there will be a surplus of crude from the North Slope of Alaska. Presumably this crude could be substituted for foreign crude. Even a cursory investigation, however, indicates that the quality of the North Slope crude is considerably different from the quality of the crudes being imported. Most noticeable is the higher sulfur content and larger proportion of residual fuel oil in the North Slope crude.

In order to evaluate the effects of substituting North Slope crude for foreign crude, each of Hawaii's refiners were asked to provide production estimates based on three crude supply situations. First, the normal crude supplies where foreign crudes are readily available. This provides the "Base Case" where normal market demands are met. Second, they were asked to estimate production if a North Slope crude were to be substituted for all foreign crude. This would approximate a situation where there were no strategic storage and all foreign crude had to be replaced with North Slope. This results in the production of products which, in some cases, severely violate quality and environmental specifications.

This suggests a third case where North Slope crude is substituted for foreign crude to the maximum extent feasible without violating quality and environmental specifications. The minimum quantities of foreign crude required to meet specifications would be supplied from strategic storage.

The detailed results of this study are shown in Appendix A, B, and C attached.

The results are summarized below:

	Base case	Full North Slope	Maximum feasible North Slope
Crude supply:			
Seria.....	48		53
Oman.....	12		
Arabian Heavy.....	8		13
Sumatran Light.....	36		31
California Blend.....	11	11	11
North Slope.....	0	98	16
Products:²			
LPG.....	2	1	1
Gasoline.....	29	21	30
SNG naphtha.....	2	0	0
Jet fuel.....	42	17	19
Distilled fuel.....	23	18	23
Fuel oil.....	16	54	13
LSFO.....	34		30
Asphalt.....	1		1
	149	111	117

¹ This crude required in order to produce asphalt. In an emergency situation, the small quantity of asphalt required may not justify segregated storage of crude.

² Includes products of refinery and adjustment for imports and exports. For substitution cases all domestic imports and exports are included, all foreign imports and exports are zero except 5,000 bbl/day of products supplied to the Mid-Pacific Islands traditionally dependent upon Hawaii for their basic fuel needs.

The above table illustrates that the protection envisioned by the Strategic Petroleum Reserve Program cannot be achieved by substitution of North Slope crude for foreign crude. It appears, however, that a Strategic Reserve in combination with substitution of N. Slope crude will produce a slate of products reasonably in consonance with the needs of this non-contiguous area. In no case can the storage of crude oil satisfy the disproportionate need for jet fuel. Strategic storage must be provided for jet fuel.

STRATEGIC RESERVES

The above analysis indicates that an emergency contingency plan substituting North Slope crude oil for foreign crude to the maximum extent possible while providing a strategic reserve of higher quality foreign crude and supplementary jet fuel is the most economical means of providing the protection envisioned by the Energy Policy and Conservation Act of 1975. The specific quantities of crude and products to be stored are basically as shown in the "Maximum Feasible North Slope Substitution" case. Storage should include two types of foreign crude and one type jet fuel, JP-5. Quantities are as follows:

	Barrels
Seria Crude 90 days at 53,000 BPD.....	4, 770, 000
Sumatran Lt. (Minas) Crude, 90 days at 34,000 BPD.....	3, 060, 000
Jet Fuel (JP-5), 90 days at 23,000 BPD.....	2, 070, 000
Total.....	9, 900, 000

EMBARGO STRATEGY

A. *Full Embargo.*—Where a full embargo is in effect, interrupting the import of all foreign crude and products, the recommended system would provide 90 days protection assuming a 6 percent demand restraint on all products.

Counteractions include:

1. Take actions necessary to restrain demand approximately 6 percent on all products.
2. Divert 16,000 BPD of North Slope crude to Hawaii.
3. Withdraw 53,000 BPD of Seria from Strategic Storage.
4. Withdraw 34,000 BPD of Sumatran Lt. from Strategic Storage.
5. Withdraw 23,000 BPD of Jet Fuel from Strategic Storage.

B. Embargo Affecting Middle East Crude and Products Only.—An embargo affecting Middle East crude and products only could be countered yielding approximately 954 days of protection, assuming jet fuel needs can be met. Twelve thousand BPD of Oman crude would be lost. This could be replaced with 7 MBPD of North Slope crude and 5 MBPD of Seria from storage. The 8 MBPD of Arabian Hvy crude lost could all be made up with North Slope, assuming asphalt manufacture is not critical.

Counteractions include:

1. Take actions necessary to restrain demand 6 percent overall.
2. Divert 15,000 BPD of North Slope crude to Hawaii.
3. Withdraw 5,000 BPD Seria from Strategic Storage.
4. Withdraw Jet Fuel from Strategic Storage as required.

C. Embargo Affecting Indonesian Area Crude and Products Only.—An embargo affecting Indonesian area crudes and products could be countered yielding approximately 90 days of protection without demand restraint. Forty-eight thousand BPD of Seria crude would be lost and have to be replaced from storage. Thirty-six thousand BPD of Sumatran Lt. crude would also be lost requiring the withdrawal of 34,000 BPD of Sumatran Lt. from Strategic Storage and 2,000 BPD of North Slope crude.

Counteractions include:

1. Withdraw 48,000 BPD of Seria from Strategic Storage.
2. Withdraw 34,000 BPD of Sumatran Lt. crude from Strategic Storage.
3. Divert 2,000 BPD of North Slope crude to Hawaii.
4. Withdraw jet fuel from Strategic Storage as required.

AREAS OF CONCERN

While the program proposed above will provide a good measure of protection for Hawaii, there are several products which need to be studied in more detail. These are as follows:

The proposed program will result in a loss of 50% of Hawaii's supply of LPG. Since this is a utility fuel, critical to Hawaii's economy, attention should be given to replacing this loss. If the deficit must be made up by Strategic Storage, this would add the requirement for 90,000 barrels of LPG storage.

The preliminary analysis of the products produced in the Maximum Feasible North Slope Crude Substitution Case indicates that paraffinic naphtha suitable for use as SNG plant feedstock will not be produced. However, the naphtha from the Minas crude needs to be further evaluated for possible use as an SNG Plant feedstock. If suitable naphtha cannot be found, an additional 180,000 barrels of Strategic Storage would have to be established to provide feedstock for the production of this essential utility fuel.

Finally, if only two crudes are stored as proposed and no Arabian Heavy crude is provided, the 1,000 barrels per day of asphalt normally produced will not be available. It may be that this relatively small requirement can be deferred during the emergency, can be met from normal stocks, or the "Calif. Blend" of crude can be modified to provide some asphalt producing stock.

Each of these areas will be the subject of additional study in the coming months. While the quantities involved are relatively small, the loss of these products, particularly the utility gas supply, could be critical.

RELATIONSHIP TO NATIONAL PROGRAM

The quantity of strategic reserve stocks recommended herein for Hawaii are significant, but certainly not large compared to national needs. Hawaii fills a unique position in the defense posture of the United States. It is truly America's "window" into Asia. By virtue of its unique geology and geography, Hawaii has traditionally suffered a significant energy cost disadvantage compared to the mainland. When foreign crude costs were lower than domestic crudes, U.S. energy policy severely restricted use of foreign crude supplied to Hawaii by vessel, yet freely allowed the importation of low cost foreign crude to mainland states by pipeline. In recent years as domestic crudes have become less expensive than foreign crudes, we find domestic crudes are in short supply and only available with the increased cost of shipment to Hawaii in U.S. Flag tankers. This disadvantage is only imperfectly offset by the entitlements program.

In any case, the "Energy Policy and Conservation Act" of 22 December 1975 specifically takes note of Hawaii's unique needs in the Strategic Reserves Program and provides for them. According to the Early Storage Reserve Plan, the Strategic Petroleum Reserve is to provide storage for 500 million barrels of crude and products. The 10 million barrels of storage required for Hawaii is only 2% of this total, certainly not a disproportionate share by any measure.

APPENDIX

- A. Hawaii Energy Supply; Base Case
 B. Hawaii Energy Supply; Full Prudhoe Bay Substitution Case
 C. Hawaii Energy Supply; Maximum Feasible Prudhoe Bay Substitution Case

HAWAII ENERGY SUPPLY—BASE CASE, 1976

(Quantity in thousand barrels per day)

Crude supply	Quantity	°API	Weight, per- cent sulfur
HIRI:			
Seria.....	48	38.8	0.05
Oman.....	12	32.8	1.25
Socal:			
Arabian heavy.....	8	28.2	2.84
Sumatran light.....	36	35.2	.09
California Blend.....	11		
HIRI Reformate.....	1		

Assumptions.—Approximately 5,000 barrels per day of mostly middle distillate products are shipped to the small Mid Pacific Islands which have traditionally depended upon Hawaii for fuel.

Comments.—The base case displays the heavy dependence of Hawaii upon foreign crude oil (90% of feedstocks to refineries is foreign) and the heavy dependence upon foreign refined jet fuel (55% of supply is foreign). Both of the crude and jet fuel are critical to Hawaii's economy.

HAWAII PETROLEUM MOVEMENT SUMMARY—BASE CASE, 1976

Product	Hiri	Socal	Imports		Exports		Hawaiian Demand
			Domestic	Foreign	Domestic	Foreign	
LPG.....		1		1			12
Gasoline.....	9	17	3		10		19
SNG naphtha.....	2						2
Jet fuel.....	10	9		23			42
Distillate fuel.....	16	5	2		2	5	16
Fuel oil.....	2	14					16
LSFO.....	18	10		6	16		18
Asphalt.....		1					1
Total.....	57	57	5	30	28	5	116

¹ Obtained by adding imports to production, no evidence of significant export.

² Estimated effect of HIRI 57 Mbb/d production—gasoline imports in 1974 were 5.8. Exports obtained by summation.

³ Estimated effect of HIRI at 57M bbl/d—1974 imports of 8M bbl/d have probably dropped. Exports estimated at 5M bbl/d to Pacific Islands and 2M bbl/d to West Coast. Distillate fuel imports assumed domestic.

HAWAII ENERGY SUPPLY—FULL PRUDHOE BAY SUBSTITUTION CASE, 1976

(Quantity in thousand barrels per day)

Crude supply	Quantity	°API	Sulfur
HIRI: Prudhoe Bay.....	60	27.4	1
Socal:			
Prudhoe Bay.....	38	27.4	1
California Blend.....	11		
HIRI Reformate.....	1		

Assumptions.—Prudhoe Bay crude is substituted for all foreign crude. Domestic feedstocks will continue to be available. Both Hawaii refiners stress the lack of information and practical experience on N. Slope crudes. Production estimates are only guides. Various product specifications on the gasolines, diesels and fuel oils could be violated.

In computing the availability of fuels, it was assumed that all foreign imports would be interrupted, domestic imports will continue. Supply obligations to domestic export customers will continue as will the obligation to supply the Mid Pacific Islands traditionally dependent upon Hawaii for basic fuels.

Comments.—This case vividly displays the impracticability of meeting our fuel demands using all North Slope crude. Even if all environmental restrictions were thrown out both in Hawaii and on the West Coast, and certain quality specifications were waived, there would still exist an insurmountable shortage of jet fuel, diesel and gasoline. The sulfur content of the residual fuel would far exceed the normal LSFO specs of 0.5% sulfur content. Full substitution of North Slope crude is not feasible.

HAWAII PETROLEUM AVAILABILITY—FULL PRUDHOE BAY SUBSTITUTION, 1976

Product	Imports				Exports		Hawaii	
	HIRI ¹	Socal ¹	Domestic	Foreign	Domestic	Foreign	Avail-ability	Demand
LPG.....		1					1	2
Gasoline.....	4	14	3		10		11	19
SNG naphtha.....							0	2
Jet fuel.....	9	8					17	42
Distillate fuel.....	^a 11	^a 5	2		2	5	11	16
Fuel oil.....	32	^a 23					54	16
LSFO.....					16		(16)	18
Asphalt.....								1
Total.....	56	50	5	0	28	5	78	116

¹ Both companies stress that they have very limited information on North Slope crude and no practical experience. The effect of the high-nitrogen content on the gasoline yield, the aromatics contents of the jet fuels and the sulfur content of all fuels are in question.

^a Will not meet Hawaii's sulfur specifications on diesels.

^a Fuel oil sulfur content in excess of 2 percent which is Hawaii's specification for high-sulfur fuel oil.

HAWAII ENERGY SUPPLY—MAXIMUM FEASIBLE PRUDHOE BAY SUBSTITUTION CASE, 1976

[Quantity in thousand barrels per day]

Crude supply	Quantity	°API	Sulfur
HIRI:			
Prudhoe Bay.....	7	27.4	1.0
Seria.....	53	38.8	.05
Socal:			
Prudhoe Bay.....	9	27.4	1.0
Arabian Heavy.....	3	28.2	2.84
Sumatran Light.....	31	35.2	.09
California Blend.....	11		
HIRI Reformate.....	1		

Assumptions.—Prudhoe Bay crude is utilized in place of foreign crude to the extent possible while still meeting the sulfur specifications on products. In the case of the SOCAL refinery, sufficient Arabian crude is processed to produce the required asphalt. Questions still remain on the quality of the products produced from N. Slope crude, but the quantity used is generally small enough that these problems should not be serious.

Again we have assumed that all foreign imports are cut off. Domestic imports of both products and feedstocks will continue. Exports to domestic customers and to the Mid Pacific Islands traditionally dependent upon Hawaii are continued.

Comments.—This case appears to be reasonably feasible. The product balances are in fair agreement with some notable exceptions. The loss of imported LPG could have serious effects on domestic, commercial and industrial users of that fuel.

The lack of a suitable feedstock for the production of utility gas (SNG) needs to be carefully considered. The loss of imported jet fuel will have serious consequences on Hawaii. The fuel oil situation is reasonably consistent with requirements, with conservation and normal emergency supplies, this does not appear to be critical.

It may also be reasonable to assume that the manufacture of asphalt may be deferred for the embargo period. In that case, no Arabian crude would be required.

HAWAII PETROLEUM AVAILABILITY—MAXIMUM FEASIBLE PRUDHOE BAY SUBSTITUTION, 1976

Product	HIRI	Social	Imports		Exports		Hawaii	
			Domestic	Foreign	Domestic	Foreign	Avail-ability	Demand
LPG			1				1	2
Gasoline	11	16	3		10		20	19
SNG naphtha							0	2
Jet fuel	10	9					19	42
Distillate fuel	16	5	2		2	5	16	16
Fuel oil		13					13	16
LSFO	20	10			16		14	18
Asphalt		1					1	
Total	57	55	5	0	28	5	84	115

¹ Asphalt production is enabled by use of 3Mbb/d of Arabian heavy crude.

FACILITY COST ESTIMATE

The following is a preliminary estimate of the cost of the Strategic Storage facility. The estimate is based on the assumption that the facility will be served by the existing marine terminals at Barber's Point, and no more than two miles of pipeline will be required to connect the facility with the terminal. It is also assumed that the facility is sited on federal property.

Facilities:

- Crude storage tanks—16 @ 500,000 bbls.
- Jet fuel tanks—7 @ 300,000 bbls.
- Pipeline connection to marine terminal—2 miles.
- Pipeline connection to Energy Corridor—2 miles.
- Pump station, crude—100 M BPD.
- Pump station, jet fuel—25 M BPD.
- Storage facility piping.
- Administrative and Security facilities.

Capital cost:

In thousands

Storage tanks—10,100,000 bbl @ \$5.00 per bbl equals (includes floating roof tank, pad and dike, painting, testing, piping and pollution control).....	\$50,500
Pipeline connection to marine terminal—2 miles @ \$500,000/mile equals.....	1,000
Storage facility piping @ 50¢/bbl.....	5,000
Pipeline connection to Energy Corridor—2 miles @ \$300,000/mile equals.....	600
Pump station, crude.....	700
Pump station, jet fuel.....	200
Fire protection facilities.....	1,000
Administrative and Security facilities.....	500
Design and Construction Supervision @ 10%.....	5,900
Contingency @ 10%.....	6,500
Total cost.....	71,900
Cost Barrel.....	7.02

CRUDE SHIPPING DATA

The following are typical round-trip times for crude oil shipments to Hawaii. This Table assumes a tanker speed of 15.5 knots and allows a total of 4 days port time for loading and discharging in each round-trip.

<i>Crude and port of origin</i>	<i>Round trip time (days)</i>
Seria/Brunei, Seria.....	33
Sumatran Lt, Dumai.....	38
Oman, Mina Al Fahal.....	53
Arabian Hvy, Ras Tanura.....	58
Badak, Santan.....	32
California, Los Angeles.....	16
North Slope, Valdez.....	19

STATEMENT OF MUTUAL ENERGY STORAGE, INC.

A COMPREHENSIVE PROGRAM FOR STORAGE OF 15 MILLION BARRELS OF CRUDE OIL

This presentation is made on behalf of Mutual Energy Storage Inc. (hereinafter "Energy Storage"), a United States corporation. Energy Storage has reviewed the Federal Energy Administration's (hereinafter "FEA") proposed Early Storage and Strategic Petroleum Reserve Programs (hereinafter collectively referred to as the "FEA Program") submitted to the Congress formally on January 10, 1977 and dated December 15, 1976 and based upon that review Energy Storage has developed the following proposal which it feels deserves careful study by both the FEA and the Congress.

Energy Storage proposes to store 15 million barrels of the overall reserve envisaged in the FEA Program. Energy Storage proposes to store this petroleum on the Grand Bahama Island immediately adjacent to an existing transfer facility and deep water port. As outlined further in this presentation, such storage should be attractive to the United States Government on the basis of the overall cost, flexibility, security and timeliness of supply. Although Energy Storage strongly supports the basic proposals contained in the FEA Program, a major weakness in such a program is the apparent lack of flexibility, the reliance upon untried technology, and substantial and still unresolved distribution programs. Energy Storage believes that its proposal effectively mitigates these shortcomings by offering a supplement to salt dome storage.

To establish a reserve storage capacity as soon as possible, Energy Storage proposes to purchase several tankers of approximately 225,000 DWT each which would be capable of onloading crude in the Persian Gulf or Africa, and sailing to the Bahamas. The tankers would be landed in specially constructed trenches for secure storage immediately adjacent to the existing supertanker transfer facility. In the alternative, Energy Storage would make its tankers available at the transfer facility to receive petroleum purchased and transported by the Government. In addition to the tanker storage, Energy Storage is prepared to construct above-ground storage tanks to handle any additional required storage. The petroleum to be stored in both the tanker and tanks could be shipped in VLCC's or even ULCC's to Grand Bahama and enter either the tankers or tanks directly through the existing transfer facility.

In the event the reserve is needed, the tankers could be released and proceed to other Caribbean refineries having deep water terminals, or be offloaded through the transfer facility and refined at a nearby refinery, or the petroleum could be transferred from the storage tankers into smaller tankers which would proceed directly to U.S. ports, particularly along the East Coast, or nearby Caribbean refineries. Sailing time to New England ports is a maximum of five days; to Delaware Bay area ports, a maximum of four days; and to Caribbean refineries, a maximum of three days.

Petroleum stored in tanks could be utilized in essentially the same manner. The Bahamian site offers sufficient transfer facilities, port depth, and refinery capacity to respond immediately and flexibly to almost any contingency.

This proposal, offering a strategic reserve of fifteen million barrels, would provide an emergency petroleum stockpile established at minimum cost and delay with the maximum utility and flexibility.

Energy Storage is presently preparing a comprehensive study of the total costs of tanker and tank storage in the Bahamas of various types of crude. This study will include not only the projected cost of storage itself but also the cost of transportation to the end user. The results of this study will be presented to the FEA and the appropriate Congressional Committees in the very near future.

We believe that any meaningful analysis of costs for storage of petroleum for the FEA Program must include not only the cost of storage itself but the overall costs of transporting the petroleum from the initial source of supply, the costs of transferring from VLCC or ULCC's to smaller tankers to enter U.S. ports, the cost of transfer into and out of a storage facility, and the cost of transporting the petroleum to a refinery. Only after analyzing the total costs of all these factors can a truly accurate cost analysis and comparison with salt dome storage be undertaken. It is the view of Energy Storage that when analyzed from this comprehensive and realistic perspective, the cost of storing a barrel of oil and delivering it to a refinery or the end consumer under this proposal will be competitive with the cost of storing oil in a salt dome under the FEA's Program.

While the FEA Program seems firmly committed to storing the bulk of the reserve in salt domes, an untested operation of this size without any alternate method for storage could have severe effects on the entire reserve system if unforeseen problems arose in allocation or distribution. Some flexibility would seem desirable. If a small percentage of the entire reserve were stored outside the salt domes, readily accessible as an alternate source, the FEA could rely upon such a source in cases to meet emergency needs that might arise.

In addition to availability and accessibility, a storage capacity as envisaged in this proposal, supplemental to the large capacity salt dome caverns, can provide FEA with the means to meet special needs for particular types of crude or crude products. For example, low-sulphur Nigerian or Libyan crudes could be stored in such quantities as are necessary to meet the needs of various refineries totally dependent on imports of such crude. Alternatively, the Bahamian site, with its warm climate, could easily provide storage at a reasonable cost for residual fuel oil to meet the special needs of New England, now 75% dependent on foreign sources.

Also, unlike tanker or tank storage in the United States, the location of petroleum storage in the Bahamas presents none of the myriad environmental problems of the complex port cavern storage system. Nor would tankers landed in specially constructed trenches present the environmental and security problems associated with floating tanker storage.

Finally, we are advised that the Bahamian Government is prepared to enter into an agreement with the United States Government to guarantee the safety of the stored petroleum and its availability to the United States at any time. This guarantee may take the form of either a formal treaty or a less formal agreement between the concerned government.

Energy Storage believes that the proposal outlined above offers the United States a margin of security to protect consumers of imported petroleum from the threat and the reality of a future embargo or supply emergency. We hope that you will consider this plan as one which will supplement the FEA Program by providing flexibility to quickly meet the needs of a region or a segment of our domestic industry unexpectedly cut off from its petroleum supply.

STATE OF NEW YORK,
ENERGY OFFICE,
Albany, N.Y., February 15, 1977.

HON. JOHN D. DINGELL,
Rayburn House Office Building,
Washington, D.C.

DEAR CONGRESSMAN DINGELL: On December 15, 1976, the Federal Energy Administration (FEA), pursuant to Sections 151-156 of the Energy Policy and Conservation Act of 1975 (EPCA-75), forwarded to Congress a Strategic Petroleum Reserve Plan (the "Plan" or "SPRP") demonstrating the manner in which this country could reduce its vulnerability to a disruption in the flow of imported petroleum supplies. For the reasons discussed below, the Plan fails to provide adequate assurance that the Northeast¹ would be protected from the adverse consequences of severe disruptions in residual oil supplies.

¹ The "Northeast" covers: New York, New Jersey, Massachusetts, Connecticut, Rhode Island, Vermont, Pennsylvania, New Hampshire and Maine.

The purposes of my letter are to alert you to the issues underlying this SPRO deficiency, to recommend appropriate modifications in the Plan and to encourage further hearings on the desirability of a Northeast regional residual oil reserve. Although establishment of a large crude oil reserve, as proposed in the SPRP, is necessary, Sections 159 and 551 of EPCA-75 apparently do not authorize Congress to approve or disapprove the Plan in part. For that reason, in light of the Plan's failure to justify exclusion of a regional residual oil reserve, the Plan should be disapproved—at least pending the outcome of hearings on this issue.

Four issues of concern are: impact of competition for residual oil, tanker availability, refinery flexibility, and pipeline capacity. The need to provide for a regional residual oil reserve will be discussed as a separate topic.

1. *Impact of Competition Between the United States and Europe.*—An embargo against the United States, in all probability, would extend to many of its European allies (and Japan). Under such circumstances, Europe—which is more dependent on imported oil than the United States—will be in direct competition for foreign residual oil. Consequently, Caribbean refineries could sell a large share of their oil to Europe. In the Plan, FEA fails to explain what assurances the United States would have that all the products made from the reserve crude shipped to the Caribbean will be shipped back to the United States.

2. *Availability of Tankers to Move Residual Oil to the Northeast.*—Notwithstanding information presented in the Plan, the availability of tankers to transport residual oil to the Northeast, in a timely manner, is questionable. In its Plan, FEA has not supported its assumptions on tanker availability. Indeed, during this past abnormally cold December-January period, there have been indications that the tight supply situation in the Northeast with respect to petroleum products has in part been caused by insufficient American flag tanker capacity for use between the Gulf and East Coasts.

The U.S. government has limited control over foreign flag vessels. Some of the countries responsible for the emergency may control the very vessels that FEA would employ to transport the products. FEA assumes that the Jones Act will be waived to permit foreign tankers to ship cargo between U.S. ports. However, on April 4, 1975, the New England Governors requested Treasury Secretary Simon to waive the Jones Act and permit a tanker of LPG to be transported by foreign flag vessel from Alaska to New England. Simon denied this request on the ground that the country's defense needs were not in jeopardy. Although more recently waivers have been granted, a waiver provision triggered by stated conditions should be incorporated explicitly into the Plan.

In addition, FEA has failed to analyze constraints on tanker movements in rivers that may freeze. In 1975, the Hudson River froze, preventing timely arrivals of product in northern New York State. The current freeze of portions of the Mississippi and Ohio Rivers provides dramatic evidence that extremely cold weather can materially disrupt inland waterway transportation.

3. *Refinery Flexibility.*—The Gulf Coast refineries may not have the assumed capacity to shift from production of light product to residual fuel. The imposition of an embargo would not necessarily be preceded by economic signals that would have prompted refineries to adjust their product mix before the interruption. Some time would likely elapse before Gulf Coast refineries would maximize residual oil yields and increase deliveries to the Northeast. To anticipate this potential problem, the Plan should provide for maximization of residual oil production at specified refineries at the onset of a supply disruption.

In the Plan, FEA assumes that a 250,000 barrel per day refinery will be operated in Pittston, Maine or the Gulf Coast area; however, FEA provides no basis for assuming that such a refinery would be built by 1980, if ever. The construction of a modern refinery requires a minimum of five to seven years lead time.

4. *Pipeline Capacity.*—Existing pipelines may not have the capacity to move the oil to designated refineries. The Plan does not document the assumptions that additional pipeline capacity between Gulf Coast and Northern Tier refineries or between the Gulf Coast and East Coast will be constructed. It is uneconomic to construct a pipeline simply for the purpose of creating alternative supply capability during an embargo. Further, monies designated for new product pipelines, which in all probability would be unable to transport residual oil to affected markets, would better serve the Northeast if invested in regional residual oil storage facilities.

The uncertainties raised by the questions discussed above underscore the importance of addressing the more detail the advisability of creating a residual oil storage reserve in the Northeast. The Plan explicitly eliminates refined petroleum products from a regional reserve. In its place, FEA proposes to incorporate

the need for petroleum product reserves within the centrally-located strategic crude oil reserve, to be located in salt domes in Louisiana, Texas, Ohio and Kentucky.

This FEA decision appears to fly in the face of Section 157 of EPCA-75, which states that for areas importing 20 percent or more of a petroleum product, a regional reserve shall be established in or readily accessible to such a region. The Northeast imports over 65 percent of its residual fuel, thus clearly qualifying this region for a regional reserve. Preliminary research indicates that regional storage ranging from 22 to 24 million barrels would afford the Northeast a reasonable degree of protection for the period during which alternative supply capability is being "cranked up." This reserve, coupled with existing industrial and utility storage, would provide the Northeast states with a three-month "buffer" against a 45 percent reduction in residual oil imports.

In addition, residual storage could be designed to minimize the possibility of outages of conforming residual oil—a problem encountered during the embargo and a problem now being encountered in the Northeast due to distribution disruptions. The regional reserve, by providing the necessary time to permit rearranging supply deliveries, will lessen the problem of solving fuel shortages while maintaining environmental standards.

On the basis of these comments, Congress should seek from FEA immediate clarification of the basis for its conclusion that the Northeast would be well-served if its proposed Plan were implemented. Absent a persuasive justification from FEA, its Plan should be disapproved. Such clarification could appropriately be sought in a hearing on a Northeast residual oil reserve.

In the event that you have any questions concerning this request, I would be happy to provide you, or your staff, with additional information.

Sincerely,

JEFFERY C. COHEN,
Acting Commissioner.

SIERRA CLUB
GULF COAST REGIONAL CONSERVATION COMMITTEE,
Baton Rouge, La., February 22, 1977.

Re Federal Energy Administration's Strategic Petroleum Reserve Plan
December 15, 1976.

Hon. JOHN D. DINGELL,
Chairman, Subcommittee on Energy and Power, House of Representatives, Washington, D.C.

Dear Sir: I would like to have been in Washington for the hearing which I understand your subcommittee held on the Strategic Petroleum Reserve (SPR) Plan. The different presentations would have been very interesting to hear. I ask instead, however, that you include these comments in the record of the hearing.

The Gulf Coast Regional Conservation Committee (GCRCC) first learned about the SPR and its Early Storage Reserve (ESR) from Mr. Joseph W. Cole, Jr., who spoke to your subcommittee. He was invited to meet with us at Clearwater Beach, Florida this past June, and he informed us generally about the ESR, which is a proposal to store some 150 million barrels of crude oil in the salt domes and beds of the coastal wetlands of Louisiana and Texas. We were very surprised to learn that FEA had done considerable work on the proposal, and was in the final stages of its decision-making procedures. After all, none of us had received any communications from FEA, nor had we received copies of the generic draft environmental impact statement, nor the mid-1976 report to Congress.

The SPR plan has not been presented to the citizens in any meaningful manner until this month when FEA attended hearings called by two parish police juries and certainly the public participation is not that envisioned by the Federal Administrative Procedure Act nor by the National Environmental Policy Act. I realize the time frame set by Congress is perhaps partially to blame. Yet, I cannot believe that Congress intended to absolve FEA of its responsibilities under all other federal laws.

We have many social, economic, and environmental concerns about the specific sites which FEA has chosen, and we have serious doubts about the quality of the decision-making process. Our chapter which includes both Louisiana and Mississippi has recently gone on record as being totally opposed to the specific sites chosen by FEA in the Louisiana coastal wetlands, for these very same reasons.

One expert which claims to have engineered and constructed over 90 percent of all mined storage for one hydrocarbon, liquefied propane gas, in the United States, has said that *no* part of Louisiana is favorable for mined storage. See appendix "A" which is attached to this letter.¹

Those of us living in the Baton Rouge area are very concerned about the Bayou Choctaw site. A newscaster said last week on local television that there are an average of 300 oil spills a month on the Mississippi River between Baton Rouge and New Orleans. Baton Rouge is believed to be the farthest inland of any inland seaport in the U.S. and there are many, many tankers on the Mississippi River. The scale of the Bayou Choctaw Dome proposal: 99 million barrels of crude oil is difficult for most of us to imagine, until we think that it equals the cargo of 60 *Argo Merchants*.

Local citizens are just now beginning to provide FEA with facts which it obviously has not had. I attended a meeting of the Iberville Parish Police Jury on February 14, 1977, and heard Thomas Noel, SPR Administrator, say that when the decision is made to use Bayou Choctaw, he will take steps to order the inspection of the existing caverns in the salt dome to see if they can be used for storage of the imported crude oil. I could not believe this terrible admission. One of the strongest selling points for use of the Bayou Choctaw dome is that it already has several mined storage caverns in it, but Mr. Noel does not yet actually know if crude oil can be stored in them.

Local citizens are just now beginning to provide information and to question the feasibility of the ESR proposal. FEA's denial to them of input into the decision-making process has created a situation where citizens are denied important legal rights, and it is denied vital information.

I do not believe that Congress should accept a plan which has had so little appropriate study and planning.

Sincerely yours,

DORIS FALKENHEINER,
Vice President For Oceans And Oil.

[Telegram]

HONOLULU, HAWAII, June 24, 1976.

HON. JOHN DINGELL,
Chairman, Subcommittee on Energy and Power, Committee on Interstate and Foreign Commerce, House of Representatives, Washington, D.C.

MR. CHAIRMAN AND HONORABLE MEMBERS: I had hoped to be present personally to ask your honorable body for reconsideration of the FEA's plan for strategic storage of petroleum reserves as it relates to Hawaii. Unfortunately, pressing matters in the district had made this impossible, hence, this request in writing for your consideration.

Hawaii is uniquely situated 2,500 sea miles from any source of petroleum.

Petroleum is the only—and I stress only—energy source in the State.

Contemplation of emergency needs of 10 million barrels of petroleum products stored in salt domes on the gulf coast is very disturbing to Hawaii. The long delivery delays occasioned by this distance would mean, for all practical purposes, that the emergency may be over before supplies arrive.

There is evidence in abundance presented by representatives of State government of Hawaii and petroleum industry representatives from Honolulu before the Senate Subcommittee two weeks ago which indicates a very low cost increase factor, little if any environmental damage and extraordinarily pressing needs for readily available energy supplies for the State. I have no wish to burden this honorable body with additional information so I base my plea for reconsideration for the FEA plan on the data already presented at the Senate hearings.

Thank you very much for your consideration and understanding of a peculiar need of my unique State.

Sincerely,

CECIL (Cec) HEFTEL.

[Whereupon, at 4:26 p.m., the committee adjourned.]

¹ The attachment referred to appears as Appendix I to Mr. Cole's submission, p. 242, this hearing, and is, therefore, not reprinted here.

