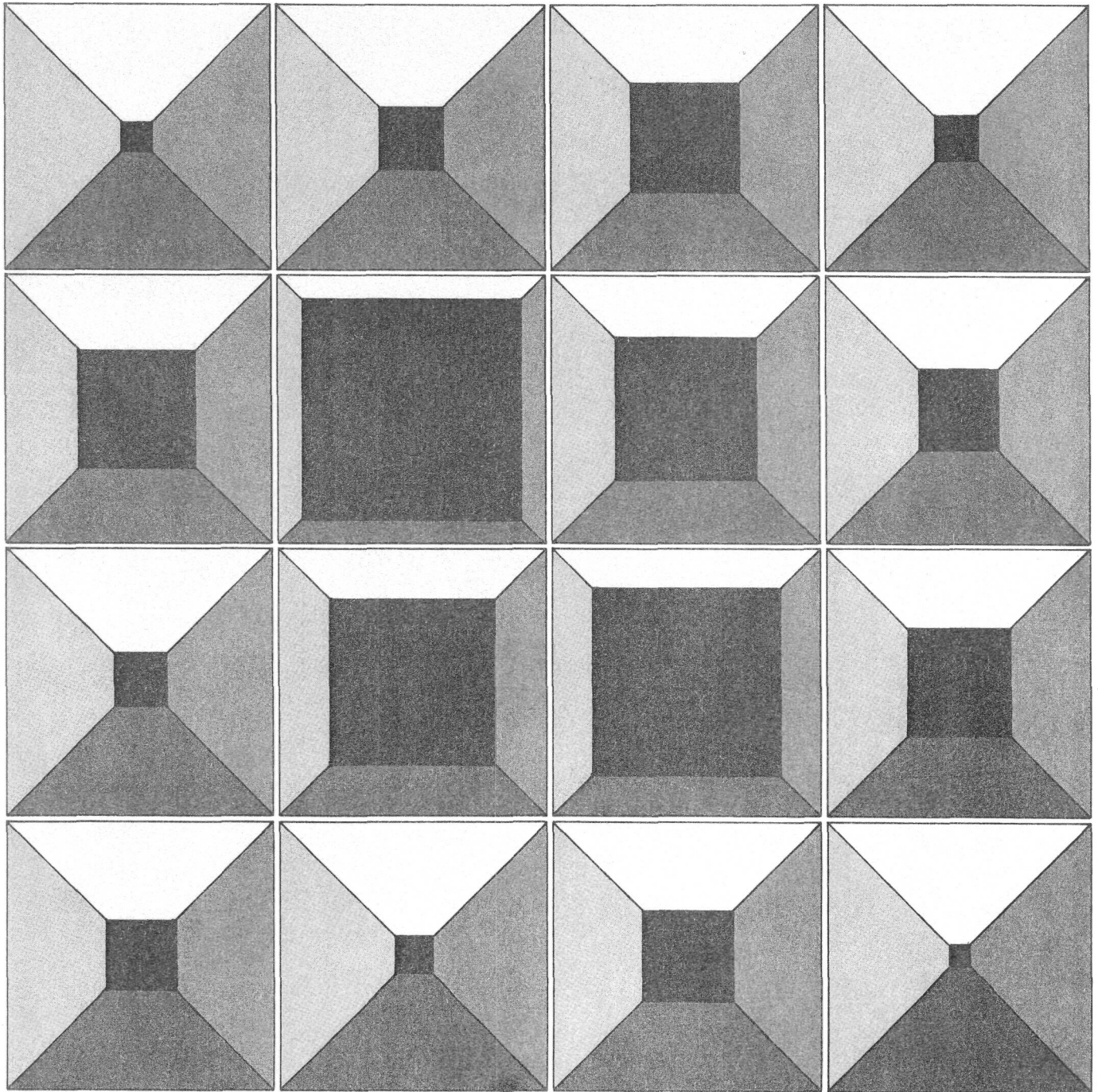
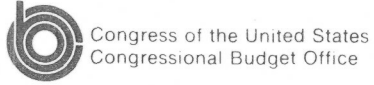


Financing Options for the Strategic Petroleum Reserve

A CBO Study
April 1981



**FINANCING OPTIONS FOR THE
STRATEGIC PETROLEUM RESERVE**

**The Congress of the United States
Congressional Budget Office**

PREFACE

In the Energy Policy and Conservation Act of 1975 and the Energy Security Act of 1980, the Congress has supported the Strategic Petroleum Reserve (SPR). Previous Congressional Budget Office (CBO) studies have discussed the potential benefits the SPR can convey during oil import interruptions. Yet the costs of acquiring the SPR have continually increased and its funding from general revenues may be jeopardized during periods of austere budgets.

At the request of the Oversight and Investigations Subcommittee of the House Energy and Commerce Committee, the Congressional Budget Office has prepared this analysis of SPR financing options. In keeping with CBO's mandate to provide objective analysis, this report contains no recommendations.

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SUMMARY

U.S. vulnerability to disruptions in imported oil supplies led the 95th Congress to authorize the creation of a Strategic Petroleum Reserve (SPR) in the Energy Policy and Conservation Act (EPCA) of 1975. Previous Congressional Budget Office (CBO) studies have demonstrated that the SPR could be highly effective in mitigating some of the adverse economic effects associated with supply interruptions. One projection, for example, indicated that in the absence of a reserve, a year-long shortfall of 2 million barrels per day in 1984 would reduce projected GNP by approximately \$146 billion (3.6 percent) and increase the unemployment rate by 1.1 percentage points and the inflation rate by 7 percentage points. Drawing down a 750 million barrel reserve could avert virtually the entire impact of such a disruption.

These benefits notwithstanding, the SPR program has experienced numerous difficulties and delays. Of the 1 billion barrels of storage capacity authorized by the Congress, only 250 million have been completed, with 150 million more slated for completion by 1985. Furthermore, the reserve now contains only 121 million barrels of oil. In response to the tight world oil market caused by the Iranian Revolution, the Department of Energy (DOE) suspended oil purchases in February 1979, only to resume them at the direction of the Energy Security Act passed by the Congress in 1980.

FINANCING THE RESERVE

Current Administration plans call for a fill rate of 200,000 barrels per day for the remainder of fiscal year 1981, and 230,000 barrels per day in fiscal year 1982. Together with the 121 million barrels of oil now in the reserve, this would create a reserve of 250 million barrels by the end of 1982. Maintenance of the latest Administration plan for filling the reserve, which averages about 195,000 barrels per day over the next seven years, would create a 750 million barrel reserve by the end of 1989.

Filling the reserve under this schedule would require total additional budget authority for oil of \$36.7 billion in fiscal years 1981-1989, including the supplemental \$1.3 billion sought by the Administration for fiscal year 1981. A supplemental appropriation is necessary because of the cessation of the entitlements benefits the reserve received while oil price controls were still in effect. Annual budget requirements for the SPR fluctuate with the

planned rate of fill, rising from \$4.4 billion in fiscal year 1981 to a peak of \$7.4 billion in fiscal year 1987. The total cost of a 750 million barrel reserve, including the funds appropriated to date, is estimated to be \$44.8 billion.

Together, these significant budgetary impacts and the compelling benefits of the SPR have recently focused attention on methods to attract private funds into the SPR program. This paper analyzes four of these financing options:

- o Public Capitalization of the SPR (or SPR "certificates"). This option would allow private investors to speculate in oil by purchasing title to the value of a specified quantity of oil in the reserve. The return on the investment would depend solely on increases in the value of oil, and could be realized by trading the certificates on a secondary market, redeeming them upon reserve depletion, or holding them to maturity. This approach is used in the bill submitted by Congressman Gramm (H.R. 2304).
- o Debt Financing of the SPR. This alternative could be achieved by the federal government through the issue of a new series of bonds, the sole purpose of which would be to raise money for the SPR program. The new debt instrument could bear either a market rate of interest or a yield related to the rate of oil price appreciation.
- o Development of an Industrial Petroleum Reserve (IPR). This type of financing would shift the focus, and much of the burden, of the oil stockpiling program to the private sector. Several policies could result in an IPR. Using the authority provided by the EPCA, the President could require all importers and refiners to store up to 3 percent of their consumption in a separate emergency inventory. Alternatively, the government could provide financial incentives--tax credits or direct subsidies, for example--to firms increasing their inventories. Another plan would use the EPCA authority, but would allow those firms required to store oil only to show evidence that someone is storing the oil for them. Thus, with this last plan, some speculative capital might be attracted from outside the industry.
- o Mandated Private Contributions to the SPR. Firms importing, refining, or domestically producing oil could be directed to supply specified amounts of oil to the SPR. The government could impose these costs on the firms (to the extent that they were unable to pass the costs onto consumers), or subsidize them.

Further, the oil or the market value of the oil could be guaranteed to each contributor in the event of reserve depletion. Senator Kassebaum's bill, S. 707, typifies this approach.

These options are not all mutually exclusive, nor would their implementation preclude continuing the current program. Each plan offers some advantages and disadvantages when compared to the others, and some combination of approaches may be appropriate, to enable more flexible responses to a range of supply interruptions.

EVALUATION OF SPR FINANCING OPTIONS

Alternative ways of financing the SPR can be evaluated by several criteria. The most important of these concerns the distribution of the economic costs, benefits, and risks associated with the creation and depletion of the SPR. Four other criteria are discussed later in this section.

Economic Costs and Risks

Stockpiling oil entails a resource cost to society, as it displaces alternative economic activity and possibly more productive investment, and limits available funds for alternative social uses. Nevertheless, the reserve program benefits all sectors of the economy by reducing the adverse effects of oil supply interruptions. Drawing upon reserve oil during an interruption would bolster employment, contain inflation, and maintain the profit margins of firms. Finally, upon depletion, revenues would accrue to the owners of reserve oil--whether they be the federal government or private sector participants.

The costs for developing a reserve, however, can be shifted among various groups, depending on the financing method chosen. The total costs for alternative methods would differ slightly, as a result of different institutional arrangements and, in some cases, economies of scale. In addition, Treasury debt financing would offer the lowest expected cost of all types of borrowing.

Yet, the bulk of SPR costs are inescapable, although they may be fully offset by the sales of SPR oil if the price of oil rises faster than the rate of return on an alternative investment--presumably the interest rate on Treasury bills. Thus, whoever finances the SPR assumes the risk that oil prices will not rise faster than the rate of interest. Under the current arrangement, in which oil is purchased through direct government expenditures, the taxpayers bear the risk. Plans that force firms to hold inventories

or contribute oil to the SPR would transfer the burden to the oil industry, which, in turn, could pass on some of the costs to consumers. Since the abilities of individual firms to acquire and store oil vary, some firms would be placed at a competitive advantage. Financing methods that rely on the speculative demand of individuals would shift the SPR costs from the taxpayers or firms to those individuals most willing to assume the risks in order to capture possible speculative gains. Thus, private financing arrangements would allow the economy to benefit from the oil provided by the reserve during an interruption, but without requiring that taxpayers bear the risks regarding the rate of increase of oil prices.

Other Criteria

The financing options can also be measured against the following four criteria.

- o Degree of Federal Control. To the extent that the SPR remains in the hands of the federal government, the option should preserve an appropriate level of federal control over reserve management.
- o Budgetary Effects. The option must have a predictable effect on the budget, and must provide SPR oil efficiently.
- o Speed and Level of Acquisition. The option must allow for as rapid a buildup of the reserves as necessary.
- o Producer Nation Response. The response of producer nations, which are opposed to the acquisition of SPR oil, must be assayed.

Degree of Federal Control. Both the public capitalization and debt financing plans would preserve maximum federal control over the SPR. Should the securities sold to the public to underwrite the SPR be denominated by the rate of oil price increase, it is possible that some SPR security holders might pressure for a depletion of the SPR while its price is perceived to be at a maximum. Transferable titles, however, leading to an active secondary market for SPR securities, might diffuse this pressure. Mandating firms to contribute oil to the SPR would allow the government physical control of the oil. The contributors, having both an interest in the SPR and an active role in the oil market, might, however, be able to pressure the SPR administrator to their advantage. IPR options would reduce the federal government's control of the SPR. If firms were given control over their IPR reserves they might not choose to use them when the government sought to deplete the IPRs, opting to hoard the reserves in expectation of higher oil prices in the short term.

Despite these potential disadvantages, a combination of policies, with the associated mix of federal and private control might be appropriate. The federal government is unlikely to draw upon its centralized reserve in any situation short of a very severe supply interruption. During smaller disruptions, it might be desirable for the government to authorize the private sector to release IPR oil, and allow firms to bring their oil to the market as they see fit.

Budgetary Effects. While the current program entails large expenditures, it does allow the federal government to capture the revenues resulting from reserve depletion. The budgetary effects of the four alternative financing plans would depend on both the structure of each plan and the degree to which it succeeds. Plans that call for off-budget financing would make no significant demands on the federal budget, unless insufficient investment of private capital required supplemental federal expenditures to achieve desired fill rates. Public capitalization of the SPR and plans that allow each firm to fill its IPR with oil held by private individuals for speculative purposes fall within this group, since the public would buy oil and receive the receipts of SPR depletion sales under these arrangements. Issuance of bonds yielding a return determined by the rate of oil price increases could require annual, but unpredictable, interest payments.

There is no guarantee, however, that any of these speculation-based plans would succeed in filling the SPR or IPR at the desired rate. If they fell short, some back-up system would be required to make up the difference, presumably using public funds, as in the current program. Thus, these plans would have no budget effect for each barrel of oil that they acquired, but could have a serious budgetary effect if they did not succeed in attracting enough private capital to fill the SPR. This effect would be equivalent to that of the current program for the same quantity of oil, but without the benefit of advance planning.

Debt financing of the SPR at the market rate of interest would have the budgetary effect of conventional debt financing by borrowing money at prevailing market rates. Plans to provide incentives to firms to hold extra inventories would affect the budget. Given the uncertainties surrounding firms' willingness to hold oil in response to incentives and the extent of the incentives required, the budgetary effect cannot be estimated with any degree of reliability. The budgetary effect of mandating oil contributions to the SPR would depend largely on the degree to which the government subsidized the contributions. If, for example, the government provided the carrying charges of the contributed oil, the short-term budget effect would be similar to that of debt financing. Plans to decree that firms hold an IPR would have no direct budgetary effect, but might well create equity problems within the refining industry.

Speed and Level of Acquisition. Those SPR financing plans that are based on speculative demand for oil--public capitalization of the SPR, debt financing of the SPR using securities denominated by the rate of oil price increase, and plans for speculative purchase of firms' IPRs--would not guarantee speedy completion of a strategic reserve. Plans to decree the existence of an IPR or to offer incentives for its creation might face difficulties in securing compliance. Inventories might be manipulated to present the illusion of compliance, or tank and pipeline bottoms (inventories that cannot be used) might be depicted as IPR oil. Mandating contributions would likely require noncompliance penalties but these might be easier to monitor. Debt financing of the SPR at market rates of interest, however, would provide enough financing to secure reserve oil if it is decided to buy it expeditiously.

None of the financing options would conflict with the goal of creating new storage capacity efficiently. New capacity can be drawn from three sources--new salt dome facilities, newly constructed above-ground storage, and renovation of old facilities. Salt dome storage capacity currently costs only \$2 to \$3 per barrel, compared to \$12 to \$16 per barrel for new above-ground steel tanks. The costs of renovation vary, depending on the specific characteristics of the existing facilities, the availability of which is unclear. Since salt dome storage capacity, the least expensive type, requires long lead times, an aggressive oil acquisition strategy would likely entail the higher costs of new, above-ground storage capacity.

Producer Nation Response. Although producer nation response to stockpiling is a central issue in acquiring SPR oil, the possible responses by producers would not vary significantly among the options considered here. Both governments and firms offer advantages and disadvantages as SPR procurers. Producers could easily react to open government purchases with political threats of production cutbacks. Political considerations move in two directions, however, as the producer nations often require certain U.S. goods or services. Given their regular pattern of crude purchases, firms could possibly purchase oil that could be diverted to SPR uses without detection. Yet, the increasingly common "destination" contracts between OPEC nations and Western consumers, in which crude destinations are stipulated, would be abrogated if such diversions occurred. Firms might be reluctant to endanger their relationships with OPEC producers for the sake of the reserve. Therefore, none of the options considered in this paper present a clear advantage in reducing the chance of adverse producer nation responses.

LEGISLATION TO REDUCE FEDERAL SPR COSTS

Much Congressional attention has focused on methods to reduce the federal expenditures for the SPR. Two recently introduced bills attempt to do this by shifting all or some of the costs to the private sector.

Private Equity Petroleum Reserve Act. On March 4, 1981, Congressman Gramm introduced the Private Equity Petroleum Reserve Act (PEPRA), H.R. 2304, which would amend the Energy Policy and Conservation Act to finance the SPR through speculative private investment. The bill authorizes the Secretary of Energy to issue 10-year negotiable certificates, denominated in barrels of oil. It sets forth a number of terms, including the pricing mechanisms and exclusion from price controls. Thus, the bill provides some of the details necessary to implement a public capitalization plan. Some problems, however, remain unsolved. The price control exemption might be needed to attract investors, but could also commit the government to allow prices to rise during future interruptions. Since the bill establishes no restrictions or limitations on the size of the allowable investment, the capital market effects remain uncertain. Finally, the bill allows the immediate sale of oil currently in the reserve, which, if sold, would reduce the future flexibility of the SPR administrator.

Strategic Petroleum Reserve Amendments of 1981. On March 12, 1981, Senator Kassebaum introduced S. 707, the Strategic Petroleum Reserve Amendments of 1981. The bill mandates that each importer of more than 75,000 barrels of crude oil per day contribute five days of imports to the SPR annually. The government would pay each contributor an annual fee of 10 percent of the purchase price for 11 years. In the event of an emergency drawdown, the contributors would receive either oil or a payment for the oil. Any such payment would be equal to the world market price at the time of distribution, less any fees already paid, with a maximum payment of the average world price prevailing during the three months preceding drawdown.

The bill remains unclear about whether the government or the firms would own the oil after 11 years, since it omits any reference to the treatment of the oil after this period. Transferring ownership to the government would place a serious burden on the contributors, since they would not only be providing oil, but a very low interest loan to the government as well. If, on the other hand, the oil reverted to the firms, the federal government would burden the firms with the cost of the oil, but the 10 percent annual fee would cover some of the carrying charges.

While the Kassebaum bill would burden the contributing firms with some of the financial risks of the SPR, it would not provide a decentralized,

privately held reserve to complement the SPR. Concomitantly, though, it would provide little incentive for firms to reduce their conventional inventories. By focusing on crude oil and ignoring petroleum products, however, the bill would tend to subsidize foreign refineries.

RELATED ISSUES

In addition to the evaluating criteria discussed above, several related issues should be kept in mind when considering alternative financing options.

SPR Security Design and Capital Market Effects

In devising a new SPR security, the Congress would determine where in the capital market it would compete for investor attention. SPR securities tied to the rate of oil price appreciation would be competitive with other "inflationary hedges," such as gold, real estate, or other commodity futures. Securities tied to the market rate of interest would be indistinguishable from other standard government securities, such as Treasury notes, bonds, and bills. The minimum investment required would also affect the position of SPR securities in capital markets. If SPR securities were issued in small denominations, they might compete with savings accounts, the predominant source of mortgage funds. On the other hand, high minimum investment requirements might preclude some classes of investors from buying the securities.

Retaining the SPR Program within DOE

The primary advantage of moving the SPR program from the Department of Energy to a separate administrative body is the independence such an entity would have. This independence might assist in filling the reserve through improving investor confidence in the reserve's management and financial integrity. Some measure of freedom from Civil Service personnel selection procedures, as is afforded the Synthetic Fuels Corporation, might help attract expert management from the financial community. On the other hand, this independence could diminish Congressional control of the SPR program. Moreover, SPR purchases have, to some degree, been coordinated with other major consuming nations, in order not to place inordinate pressure on spot markets for oil. This coordination might suffer if the SPR is administered by an independent entity.

Depletion or Termination

Emergency depletion of the SPR will occur in a recessionary economic environment and amid substantial inflation. Under these conditions, there might be strong pressure to implement some type of price controls on SPR oil. Such a policy decision would eliminate the speculative value of any SPR security based on the price of oil. It might be necessary to stipulate how the SPR will be depleted and sold well before the depletion occurs in order to inspire investor confidence. Some reference price for SPR sales might be stipulated in any SPR security.

If the SPR is never used, it will inevitably be terminated and sold. Securities with a relatively short maturity, three years for example, would require frequent rollover, but might facilitate an active market. Issuing SPR securities for a longer fixed term, would permit a reappraisal of the SPR when its securities start to mature. Since the SPR will be acquired over the next 10 years, securities would be issued in annual waves, and would mature in annual waves. Thus, the SPR could be terminated gradually, as its securities were called in. IPR options, on the other hand, could leave firms with large excess inventories that could be drawn down at once, disrupting the market. IPR holding requirements could, however, be phased out slowly to avoid this problem. If the SPR were built with mandated contributions, a slow phasedown of requirements and a carefully planned reserve drawdown would also be needed to avoid market instability.

CHAPTER I. INTRODUCTION

Seven years after the oil embargo of 1973-1974, the United States remains vulnerable to interruptions in the supply of foreign oil. Political instability in the Middle East and the resulting volatility of the world oil market continue to threaten the West's oil supplies. Yet despite conservation and intensified domestic production efforts, this country still imports 35 to 40 percent of its oil supplies.

The Strategic Petroleum Reserve (SPR), authorized by the Energy Policy and Conservation Act of 1975, could mitigate many adverse economic consequences of a supply disruption by providing a standby source of oil. Although SPR crude oil purchases were halted temporarily because of tight market conditions resulting from the Iranian Revolution in 1979, they were resumed late in 1980, as mandated by the Congress in the Energy Security Act. The SPR now holds about 121 million barrels, slightly more than 10 percent of the 1 billion barrel reserve authorized by the Congress.

Since its inception in 1975, the reserve's progress has been slowed by technical, political, and economic factors. Although most of the technical problems have been solved, delays in storage capacity construction could constrain the rate of oil acquisition. Oil producing nations generally oppose the buildup of strategic reserves, and consuming nations fear the price increases that could result from increased stockpiling. Moreover, the Strategic Reserve's funding from general revenues may be jeopardized as many federal activities compete for fewer resources in a period of austere budgets.

These factors may force the Congress to consider financial and administrative alternatives to the current reserve program. Financing alternatives include:

- o Establishing a special government debt instrument to finance the SPR, which would be similar in its budgetary impact to the current system;
- o Allowing the public to purchase certificates representing a specified quantity of reserve oil as a speculative asset;
- o Using existing authority to create an Industrial Petroleum Reserve; and
- o Mandating oil industry firms to contribute oil directly to the SPR.

In addition to choosing among these options, the Congress may need to decide whether the Department of Energy should continue to manage the SPR program, or whether a separate entity, such as a quasipublic corporation, should be established for this purpose.

Chapter II provides background on the Strategic Petroleum Reserve program and describes the obstacles to its completion. Comparable foreign experience in financing oil stockpiling and production is also discussed. In Chapter III, alternate SPR financing arrangements are described and evaluated using several important criteria. The criteria include the distribution of the SPR costs, risks, and benefits; the level of federal control; the budgetary effects of alternate financing schemes; the prospects for rapid SPR acquisition under each arrangement; and possible producer nation responses to them. Chapter IV discusses some related issues, including the effects of private SPR financing on capital markets, alternative methods to administer the SPR, and termination and depletion of the SPR program.

CHAPTER II. BACKGROUND ON THE STRATEGIC PETROLEUM
RESERVE

This chapter opens with a discussion of the important economic benefits derived from a completed Strategic Petroleum Reserve--whether it be the 1 billion barrel reserve mandated by the Congress or the 750 million barrel goal now planned by the Reagan Administration. It then reviews the current status of the SPR and the obstacles, both past and present, to completing an adequate reserve. The chapter concludes with a summary of relevant foreign policies, both those developed by other industrialized nations to cope with an interruption in imported oil supplies, and the Mexican and British experiences in financing petroleum production with oil-backed bonds.

BENEFITS OF THE RESERVE

The security of U.S. imported oil supplies depends upon a number of political and economic factors. These include the level and source of U.S. imports, the tightness of the world oil market, and the political stability of the oil-exporting countries and their relations with the United States. The United States currently imports between 6 and 7 million barrels of crude oil and products a day--about 35 to 40 percent of domestic oil demand. As the United States recovers from the 1980 recession, a large portion of the ensuing increases in domestic demand will likely be met with additional imports. An uninterrupted supply of foreign oil is by no means certain. In fact, such events as the Iranian Revolution in 1979 and the Iraq-Iran War begun in 1980, point to the likelihood of future supply interruptions.

According to numerous studies, a national oil stockpile could be an effective means to mitigate some of the economic dislocations associated with an oil supply interruption. During an interruption, drawing upon reserve oil would tend to moderate oil price increases and lessen potential losses in aggregate economic activity, as measured by the Gross National Product (GNP). Using the Wharton Econometric Forecasting Model to project effects in a sample year, 1984, a CBO study indicated that a year-long national oil shortfall of 2 million barrels per day could reduce GNP by about \$146 billion (3.6 percent of projected real GNP). ^{1/} Such a shortage could also increase the unemployment rate by about 1.1 percentage points

^{1/} See Congressional Budget Office, An Evaluation of the Strategic Petroleum Reserve (June 1980).

and the inflation rate by about 7 percentage points. The analysis assumed that neither price controls nor allocation policies would be implemented.

Virtually the entire impact of such a shortfall on GNP and unemployment, as well as a large part of the inflationary effect, could be averted by drawing on a reserve of about 750 million barrels. A reserve of 1 billion barrels could almost completely offset the effects of a year-long shortfall of 3 million barrels per day. In other terms, each barrel of SPR oil could avert about \$200 of potential GNP loss in the event of a year-long supply interruption in 1984. The 1 billion barrel reserve could also offset a complete cutoff of current levels of imported oil for almost six months. Studies have generally shown that drawing on a strategic reserve may be the most effective policy for reducing the adverse effects of an oil supply interruption.

PROGRAM STATUS AND OBSTACLES TO COMPLETION

The important benefits of a reserve notwithstanding, the SPR program has experienced serious difficulties and delays both in developing storage capacity and in obtaining oil. To date, storage capacity of only 250 million barrels has been completed, with another 150 million barrels slated for completion by 1985. In addition, while many of the technical difficulties in preparing storage have been solved, only 121 million barrels of reserve oil have been acquired to date. The Department of Energy (DOE) responded to the tight oil market resulting from the Iranian Revolution by suspending oil purchases in February 1979. SPR purchases were not resumed during the first half of 1980, although surplus oil was available. The Energy Security Act of 1980, signed into law in June 1980, directed DOE to resume oil purchases at a minimum average rate of 100,000 barrels per day.

Although DOE has begun acquiring oil again, and plans to purchase more than 200,000 barrels per day during fiscal year 1982, the 1 billion barrel reserve authorized by the Congress would take more than 12 years to complete at this rate. While higher rates of fill have been suggested, several factors constrain the Strategic Reserve buildup. Two major factors--budget and political constraints--are outlined here. If these obstacles are overcome, and the SPR program begins to acquire oil at higher levels, storage capacity limits may become a constraint.

Budgetary Impact of SPR Program. The costs of developing the SPR are high. Although the Congress authorized a reserve of 1 billion barrels, the Reagan Administration plans for one of 750,000 million barrels. There are now about 121 million barrels of oil in the reserve. Current Administration plans call for a fill rate of 200,000 barrels per day in fiscal year 1981

and 230,000 barrels per day in fiscal year 1982. This would create a reserve of 250 million barrels by the end of 1982. Implementing the latest Administration plan for filling the SPR, which averages approximately 195,000 barrels per day over the next seven years, would create a 750 million barrel reserve by the end of 1989. Filling the reserve under this schedule would require total additional budget authority for oil of \$36.7 billion in fiscal years 1981-1989, including the supplemental \$1.3 billion sought by the Administration for fiscal year 1981. In addition, \$0.1 billion would be required for administration and maintenance, and \$1.6 billion for the construction of salt dome storage facilities. Budget authority requirements fluctuate with the annual planned rate of fill, rising from \$4.4 billion in fiscal year 1982, to a peak of \$7.4 billion in fiscal year 1987. The total cost of a 750 million barrel reserve, including the amount appropriated to date, is estimated to be \$44.8 billion. 2/

Political Constraints. International considerations have also played a role in slowing the progress of the reserve program. Agreements with other members of the International Energy Agency (IEA) may limit the government purchases of oil for the reserve if tight markets ensue. Furthermore, producing nations have publicly opposed the program.

The IEA member countries agreed in 1979 to consult each other before continuing to stockpile oil. They also pledged that no country would resume stockpiling if such efforts would result in pressure on the oil market, although some member nations appear to have continued aggressive stockpiling programs. In a tight market, high rates of oil purchases for the SPR could result in increased prices not only for SPR oil but also for all consumers.

On the other hand, the world oil market does not generally react dramatically to oil trades of several hundred thousand barrels per day. Further, oil prices are not set solely by market conditions. Any price increases by producing nations resulting from SPR purchases might be politically motivated and, therefore, would be impossible to predict. Nevertheless, an aggressive U.S. reserve program might be opposed by consuming-nation allies.

While the producing nations generally oppose the reserve program, their response to renewed stockpiling is uncertain. Because the SPR is owned and managed by the federal government, however, foreign producers

2/ In addition, the federal government will collect and spend about \$0.5 billion in 1981 through the oil entitlements system which was in effect prior to decontrol of oil prices on January 28, 1981.

can apply political and economic pressure on government policy-makers. Saudi Arabia, for example, has been producing about 1.5 million barrels per day more than its stated preference. While this may be to reestablish Saudi Arabia's dominance in the Organization of Petroleum Exporting Countries (OPEC), there is little doubt that such overproduction has relieved the pressure on world oil prices. The possibility of production cutbacks, market instability, and price increases in response to aggressive federal efforts to fill the SPR cannot be ignored.

Storage Facility Limits. The current SPR storage capacity of about 250 million barrels--almost one-half of which is filled--consists of salt domes in Louisiana and Texas that have been mined to produce caverns for holding oil. Current construction plans call for a total capacity at these sites of 400 million barrels by 1985. If oil was acquired at a rate of 200,000 barrels per day, existing capacity would be filled before the end of 1982. Salt cavern construction is time consuming, so there is little hope for any significant increases in SPR salt dome capacity before 1985. SPR oil could be stored in above-ground storage tanks or in excess fleet tankers, but only at very high costs. Salt dome storage capacity currently costs only \$2 to \$3 per barrel, compared to \$12 to \$16 per barrel for above-ground steel tanks. Therefore, an aggressive oil acquisition program requiring other than salt dome storage may entail high storage costs.

FOREIGN EXPERIENCE

The obstacles facing the SPR program in the United States are not unique. Other consuming nations--Germany, Japan, France, and Italy, for example--are attempting to solve similar problems. While the governments, industries, and resources of these countries differ, their oil stockpiling programs provide some insight into how the United States could work toward its stockpiling goals. In addition to consuming nations' experience, some producers--most notably, Mexico--have issued oil-backed securities, and in doing so, have provided examples of an alternative method of financing the SPR. This section describes the experience of these foreign countries that is relevant to alternative programs for building and financing the SPR. 3/

3/ For more detailed information on international stockpiling programs, see E.N. Krapels, Oil Crisis Management (Baltimore: John Hopkins University Press, 1980); and D.A. Deese and J.S. Nye, Editors, Energy and Security (Cambridge: Ballinger Publishing Company, 1981).

Germany

In addition to storing about 40 million barrels of oil (20 days of net imports) in underground caverns in its Federal (Oil) Reserve, the Federal Republic of Germany established an oil storage corporation in 1978 to manage and finance a commercial strategic oil stockpile to which member firms must contribute. This corporation, the Erdolbevorratungsverband (EBV), holds the obligatory stocks of the member corporations, which include all of the German refining and oil importing firms. The EBV can take advantage of some economies of scale not available to all individual companies, thus reducing the total cost of storage to the industry and its consumers. The debt incurred for EBV oil acquisition is financed through the private capital market, and fees paid by the member companies cover operating costs.

The debt-financed EBV provides several attractive features. Not only does it equalize the costs of emergency oil storage across the industry (on a pro rata basis), but it removes these obligatory stocks from the balance sheets of private firms. The oil companies, therefore, no longer have to finance stockpiles through additional debt or retained earnings, but must pay annual fees to cover the interest on the EBV's debt. Further, while EBV oil is generally held by individual oil industry firms, the firms cannot, during an emergency, treat the oil as their own. Thus, no direct incentives to reduce their own private stocks are created.

To finance this operation, two German banking consortia made a 10-year agreement to provide a line of credit of 4 billion deutchemarks (about \$2 billion). The EBV can borrow against this, at the German prime rate, for periods of three months to 15 years. These loans are secured by (1) the oil and storage facilities; (2) the annual payments of the member companies; and (3) standard government services offered to German corporations under public law, including bankruptcy guarantees, legal limits on losses, and insurance of the oil inventory against liquidation. The EBV was financed entirely by debt, but is allowed to build equity by retaining earnings from any inventory sales resulting from changes in the obligatory level of stocks, and from upward rounding of the member's fees.

Japan

The traditionally close relationship between the Japanese government and industry enables the industry to maintain the National Petroleum Reserve. The Ministry of International Trade and Industry (MITI) exercises responsibility for energy regulation, including emergency authority. MITI apparently relies less on specific laws for such authority than on the strong

traditional relationship between government and industry. It "guided" Japanese oil companies toward holding a 60-day supply beginning in 1972. In 1975, MITI received approval to change the target to a 90-day supply. Although private stock levels have been running at closer to 100 days of supply, the 90-day level became mandatory in April 1981. 4/

The government removed part of the storage burden from the private oil companies by commissioning the now-called Japan National Oil Corporation to establish a government stockpile to supplement the privately held reserve. This stockpile, mostly stored in surplus tankers, held more than 30 million barrels (seven days of imports) in 1980. In addition, the government provides loans for new storage construction, loans and subsidies for oil purchases, a reduced fixed asset tax on storage facilities, and accelerated depreciation of storage facilities. These incentives, however, do not relieve the companies of carrying the cost of an excess inventory.

France and Italy

In 1928, the French government began to control the importing of crude oil and petroleum products. Through decrees in 1951, 1958, and 1975, importers and refiners have been required to maintain oil stockpiles equivalent to some percentage of their oil trade. The 1975 revision set the stockpile requirement at 25 percent of domestic sales of the preceeding 12 months. These stocks are held by the industry in decentralized locations and, unlike the German petroleum industry, must be carried on their books. Since the government in France controls gasoline and distillate fuel oil prices, however, a separate tax or fee to cover the additional expense is unnecessary since price ceilings allow for the additional costs. Thus, the impact of expenses for emergency stockpiles are passed on to consumers.

The Italian strategy is similar to that of France--the legal obligation to maintain the national emergency stock rests with the oil industry. Italy's storage regulations date back to 1933, with decrees in 1961 and 1976 establishing a storage target of 90 days of the previous calendar year's domestic sales. The burden of providing the stocks rests on both refiners and owners of storage facilities. All owners of storage facilities--any large-scale oil user--must maintain a minimum oil level of 20 percent of their tank capacity. Such a requirement appears unique to the Italian program.

4/ Petroleum Intelligence Weekly, March 2, 1981, p. 11.

One aspect of both the French and Italian programs is that, while the provisions to hold a percentage of a preceding period's sales may result in a higher average stock level, this requirement clearly does not provide a dedicated reserve. This may represent a broader problem. Since both programs commingle the emergency stockpiles with normal inventories, this may result in some reduction in conventional inventories and reduce the effectiveness of the emergency stockpiles.

Mexico

In 1977, Nacional Financiera, Inc. (NAFINSA)--the Mexican national financing corporation--offered its first issue of "petrobonos," certificates of common redeemable shares, backed by the proceeds of a crude oil sale contract with Petroleos Mexicanos (PEMEX). These petrobonds were issued to encourage savings, restore confidence in the Mexican banking system, and support Mexico's economic growth by attracting new sources of domestic capital. Further, it was hoped that the petrobond issues would help stem the capital outflow from the country--a problem that contributed to the devaluation of the peso.

The first petrobond offering, made in April 1977, consisted of three-year term common share certificates sold for a total value of 2 billion pesos (then equal to \$88 million). These certificates were backed by the sales value of 6.7 million barrels of oil. Certificates provided a minimum guaranteed annual rate of return of 7 percent, revisable and payable quarterly, and guaranteed by NAFINSA and the Mexican government. At maturity, three years from the date of issue, NAFINSA would collect the receipts from the crude oil sales contract by which the issue was backed. These receipts were to be calculated using the average PEMEX export price during the first 25 days of April 1980. The certificate holders would then be paid the face value of their securities, as well as their share of the increase in the value of the oil, less any interest payments that were paid quarterly during the life of the issue. The capital appreciation was to be calculated based on the price of oil in U.S. dollars, providing some additional protection against peso devaluation.

These bearer instruments were issued in denominations ranging from 1,000 pesos (then approximately \$44) to 1 million pesos (\$44,000). They were registered with the Mexican National Securities Commission and recorded in the Mexican Stock Exchange. Thus, they were relatively liquid through an active secondary market. In addition, a number of tax provisions generally favored the individual investor over institutional and professional investors.

Mexico offered the fifth issue in April 1980, a 5 billion peso (then approximately \$220 million) issue backed by 7.2 million barrels of oil. This most recent issue guarantees a minimum after-tax net return of 10 percent. It was offered to coincide with the retirement of the 1977 issue, which, because of large increases in the world price of oil during its term, resulted in an annual yield to investors of more than 33 percent. The offering was intended to attract new investors, and provide the first-issue certificate holders the opportunity to roll over their investment.

Table 1 presents data on the five petrobond offerings. It should be noted that the fifth offering, made in April 1980, was a rollover and reissuance of the first offering. Thus, the four offerings now outstanding total \$616 million (U.S.), and are backed by 26.8 million barrels of oil. While these revenues are far smaller than those required to fill the U.S. Strategic Reserve, the volume of petrobond holdings should be considered relative to the size of Mexican capital markets. This is an appropriate comparison,

TABLE 1. MEXICAN PETROBOND OFFERINGS, 1977-1980

Date of Offering	Value of Offering		Oil Committed to Offering (in millions of barrels)
	(in billions of pesos)	(in millions of dollars)	
April 1977	2	88	6.6
April 1978	2	88	6.7
August 1979	2	88	3.9
November 1979	5	220	9.0
April 1980	<u>5</u>	<u>220</u>	<u>7.2</u>
Total	16	704	33.4
Total Now Outstanding <u>a/</u>	14	616	26.8

SOURCE: Nacional Financiera, Inc., Washington, D.C.

a/ The first issue, dated April 1977, matured in April 1980, and was reissued. Thus, the April 1977 issue is not now outstanding.

insofar as the purchasers of petrobonds have been predominantly Mexican, and the volume of barrels sold has been constrained by the size of the Mexican economy. In 1979, Diemex-Wharton projected 1980 Mexican gross fixed investment of \$29.5 billion. ^{5/} Thus, petrobonds equalled approximately 2 percent of gross fixed investment, by value. A comparable commitment to petrobonds in the United States, if measured against U.S. gross fixed investment of \$415 billion, would total \$8.3 billion. Fixed investment is used solely as a rough proxy for the size of the U.S. and Mexican capital markets. In fact, the use of this proxy underestimates the size of the U.S. capital market, since U.S. markets are far more diverse than their Mexican counterparts.

United Kingdom

In October 1980, the British Department of Energy announced the government's intention to issue revenue bonds "linked to the fortunes of the British National Oil Company's (BNOC) North Sea Fields." ^{6/} The return on this new form of savings bond would be related to revenues from specific BNOC fields. Rather than paying a periodic dividend, the government would allow the income to accumulate, presumably increasing the value of the bond over time. The government would then be committed to redeem the bonds at their accumulated value, upon bearer demand. While no further details have been released, the announcement indicates that widespread ownership would be encouraged, particularly among small savers.

^{5/} Wharton Econometric Forecasting Associates, "Diemex-Wharton Modelo Econometrico de Mexico," January 27, 1979.

^{6/} British Department of Energy, Press Notice, October 9, 1980, Reference No. 206.



CHAPTER III. EVALUATION OF SPR FINANCING OPTIONS

The stockpiling programs and oil-backed securities employed by several other countries, as discussed in Chapter II, offer relevant strategies that can be useful in developing optional financing methods for the U.S. Strategic Petroleum Reserve (SPR). Four options that could be considered alternatives or supplements to the current program are first described and then evaluated in this chapter.

ALTERNATIVE FINANCING OPTIONS

The four options analyzed here are as follows:

- o Public capitalization of the SPR;
- o Debt financing of the SPR;
- o Development of an Industrial Petroleum Reserve (IPR); and
- o Mandating firms to contribute oil to the SPR.

Public Capitalization of the SPR through SPR Certificates

Given the likelihood that the price of oil will rise in real terms over the next decade, oil emerges as a potential appreciating speculative asset. ^{1/} Private futures trading markets have already been formed for several petroleum products, although a crude oil futures market may be difficult to organize, because of the wide variety of crude oil types and the absence of stable "quality differentials" in crude oil pricing. Nevertheless, the impetus for speculative acquisition of crude oil remains strong. ^{2/} This

^{1/} Prospects for oil price increases are discussed in detail in Congressional Budget Office, The World Oil Market in the 1980s: Implications for the United States (May 1980).

^{2/} A proposal for a general petroleum futures market can be found in Arnold Safer, International Oil Policy (Lexington, Massachusetts: Heath, 1979). Safer calls for use of the SPR facilities as a storage for futures market oil, but does not discuss filling a federal strategic reserve per se.

is particularly true given the high probability of future supply interruptions, which could be accompanied by sharp price increases. This potential demand could be harnessed by allowing individuals to hold title to the value of oil in the Strategic Reserve on a speculative basis, without rights to physical delivery.

Such a system could work as follows. The federal entity administering the SPR would issue "certificates" that conveyed a title to the value of a specified quantity of oil stored in the reserve. The oil itself would be held and controlled by the federal government. The certificates initially would be offered at a price based on the acquisition cost of the average SPR barrel, plus a fee equal to the pro rata costs of transportation and administration.^{3/} The securities market would then determine how many of these certificates would be sold. This amount might fall short of the volume needed to fill the SPR. Alternatively, a fixed number of certificates could be auctioned, however, without any guarantee that sufficient funds would be collected to buy all of the oil required. If either plan had insufficient demand, the government would become the buyer of last resort.

The certificates would be transferable, allowing holders to sell them to any buyer, thus developing a secondary market for trading the certificates. Upon a decision to draw upon the reserve, the government would buy back the reserve from certificate holders, prorating its purchases from all holders if only part of the reserve was to be depleted. Other options to facilitate emergency redemptions include issuing certificates that could be called in, or establishing queuing plans. At the time of redemption, the SPR certificate holders would be compensated at a price determined by some prespecified method for valuing SPR oil. This could not only provide an attractive return to private investors, but could also assure funds to certificate holders who need to buy oil at high prices. No private interest would take delivery of SPR oil until it was depleted at the discretion of the President, and recipients of the oil--oil firms or refiners, for example--would not necessarily be related to the list of title holders.

Debt Financing of the SPR through SPR Bonds

The government could finance the reserve by creating a debt issue (SPR bond). Such a SPR bond could be assigned a market rate of interest

^{3/} See Congressional Budget Office, An Evaluation of the Strategic Petroleum Reserve (June 1980). Storage costs, having been expended, are not included in the SPR certificate fee. Inclusion of these storage costs would raise the fee from \$2 to \$3 per barrel.

(such as the Treasury bill interest rate), or could be given a rate of interest based on the appreciation in the world price of oil. The difference between these two rates of return reflects a difference in who assumes the risk regarding the likely differential between the rate of appreciation of the price of oil and the Treasury bill interest rate.

In the case of a SPR bond issue assigned the market interest rate, the government (or taxpayers) bears the risk. If the rate of oil price appreciation exceeded the interest rate, the government would be able to sell the SPR at market prices, receive revenues in excess of all remittances to SPR bond holders, and make a profit. If the interest rate exceeded the rate of appreciation of oil prices, remittances from SPR sales might not cover all interest charges, and a subsidy from general revenues might be required when the SPR was depleted. To the federal government, this SPR bond option is effectively equivalent to the current system of on-budget financing. This reflects the implicit interest cost of money spent on the SPR, which could otherwise be used for different programs or to retire outstanding federal debt.

Alternatively, SPR bonds could be given a return determined by the rate of oil price appreciation. In this case, the bonds would not have a fixed coupon rate, but the interest payment would be calculated at the end of some period, based on movements in certain oil price indicators. The structure of risk and reward under this arrangement would be the same as under the public capitalization plan--in both cases, the purchasers of either SPR certificates or SPR bonds assume the risk regarding the differential between the price of oil and the interest rate, and receive the resulting return. Unlike the SPR certificate plan, however, the government would be committed to a periodic interest payment to SPR bondholders.

Such bonds would likely have a fixed term. Short terms, from three to five years, for example, would require frequent rollovers, but might help establish an active market. Not only might an active market help attract a wide range of investor interest, but current market conditions might also favor the shorter term. An oil-based security with a 10 to 15 year maturity, on the other hand, might be viewed by many investors as a legitimate long-term inflation hedge. Such an instrument, however, if perceived as more attractive than other long-term securities, might frustrate the efforts of other borrowers, including the U.S. Treasury, to lengthen the maturity of their debt.

Development of an Industrial Petroleum Reserve

The Energy Policy and Conservation Act (EPCA) gives the Secretary of Energy the discretionary authority to require that all petroleum refiners

and importers store up to 3 percent of the oil passing through their facilities annually as an Industrial Petroleum Reserve (IPR). The IPR could be developed using one of several methods:

- o The IPR could be developed by "decree," requiring that each firm be in compliance by a given date, as provided by EPCA;
- o Incentives or subsidies could be provided to firms to induce them to store the required amounts; and
- o Firms (by and large, refiners) could be allowed to purchase "titles" to oil owned and stored by individuals on a speculative basis, as "evidence" of meeting their IPR obligations. 4/

Under the decree plan, firms would be instructed to develop their individual reserves. Such a plan could pose several difficulties. Firms vary in their ability to finance the purchases of oil to be stored and not used until the IPR was depleted. Moreover, inspecting individual firms' storage for compliance would require a large amount of administrative overhead. Some firms might manipulate inventories to assure sufficiency for inspection purposes, or count as inventories tank and pipeline "bottoms" (oil that is used to maintain the continued operation of tanks and pipelines, but cannot be processed and marketed like conventional inventories). Given these equity and administrative problems, a decree approach might be difficult to implement.

An alternative to the decree plan could be constructed through a series of tax credits, grants, or loan guarantees that would induce firms to hold the required level of inventories. Certainly, some set of incentives could be devised that would result in any desired level of inventories. It is difficult to estimate precisely what these incentives would have to be, although they would probably have a serious effect on the federal budget.

The IPR evidence plan would require that all firms responsible for the development of an IPR "provide evidence" of sufficient storage. Such storage could be achieved by the firm contracting with a storage company to hold the reserve oil (a role that could be filled by the firm itself), and allowing the general public to purchase oil on a speculative basis for fixed periods. Should the IPR be depleted, the oil owners would sell their oil either openly on the market, to a government-specified user, or to the firm

4/ One such proposal was recently made by H. R. Leuba, A Free Enterprise Oil Storage Corporation (Chevy Chase, Maryland: Jack Faucett Associates, July 1980).

for which the oil was stored. In this sense, this option resembles the public capitalization of the SPR: private individuals would buy titles to reserve oil, but, under this arrangement, the oil would be held by storage companies, not the government. The investors might be allowed the option of withdrawing their oil after each year's storage. Such an arrangement, if successful, would minimize the financial burden placed on firms that would occur under a decreed IPR.

Mandating Contributions to the SPR

Rather than mandating firms to increase their own industrial stock-piles, the SPR could be filled by requiring oil industry firms--importers, refiners, and/or producers--to supply specified quantities of oil directly to federal storage facilities. Such a requirement would necessitate new legislation.

The costs of the SPR contributions could be imposed on the firms, to the extent that they were unable to pass them onto consumers. Alternatively, the federal government could subsidize this cost, for example, by paying the contributors the cost of financing the oil they were required to contribute. Or the government could guarantee that contributors, in the event of a reserve drawdown, would receive either a quantity of oil equal to their contribution or payment for the value of the oil. Guaranteeing a payment equal to the market value of the oil would be similar to issuing equity certificates, as in the public capitalization plan, but with the added factor of mandatory participation by oil industry firms.

EVALUATING SPR OPTIONS

No matter how the reserve is financed, there is an inescapable resource cost to society as a whole in accumulating and holding the reserve. Resources that could be used for current consumption or investment are being set aside--in the form of oil--for future use. When the reserve is used, society as a whole benefits since the SPR oil can mitigate the adverse economic effects of an oil supply interruption.

The four alternative ways of financing this resource cost--of dividing it between taxpayers and private investors or firms--can be evaluated by five criteria. The most important, the distribution of resource costs and risks, is discussed first. The other four criteria--degree of federal control, budgetary effects, speed and level of oil acquisition, and producer nation response--are discussed separately later in this section.

Distribution of Resource Benefits, Costs, and Risks

The most important of these criteria concerns the distribution of the economic benefits, costs, and risks resulting from the creation and depletion of the SPR. As discussed in Chapter II, the SPR has the potential to abate significant increases in unemployment and inflation and to reduce GNP losses, all of which occur during a disruption of foreign oil supplies. The benefits of the SPR, therefore, would accrue to the economy as a whole, in the manner that society benefits from growth in GNP and employment and lower inflation. Households would benefit from increased employment and higher incomes and from the mitigation of inflation (when compared to the economic effects of a disruption in oil imports without the SPR). Firms would benefit from higher profit levels, since the SPR would help maintain the pace of economic activity, and lessen the increase in energy input costs. Finally, a benefit would accrue to whoever "owns" the SPR, in the form of the receipts from SPR oil when it is depleted. This benefit, however, is uncertain and is associated with the financing method selected.

The economic benefits are obtained at the cost of creating the SPR. These costs may be shifted among different groups, depending on the method chosen to finance SPR purchases, but are roughly the same in the aggregate. Creation of the SPR requires that the economy defer some other economic activity--be it consumption, investment, or alternate federal spending--so that enough resources can be allocated to building a reserve. Different financing options do, however, affect the total cost of the SPR. Marketing special securities to finance the SPR would require some administrative overhead. Treasury debt financing provides the lowest expected cost financing available for the SPR, because it conveys the lowest level of risk associated with any mode of financing. Yet the bulk of SPR creation costs are inescapable.

The method chosen to finance the reserve, however, will determine who bears these inescapable costs. Under the current arrangement, in which SPR costs are appropriated from general revenues, the costs are borne by taxpayers. Financing methods that employ private individuals' speculative demand for oil would shift the costs of the SPR from either taxpayers or consumers and firms to those individuals willing to assume the risk associated with the price of oil. This type of arrangement, therefore, would allow private individuals to bear some of the inescapable costs of SPR completion that would otherwise be borne by taxpayers, consumers, or firms, in exchange for the opportunity to speculate on the price of oil. Thus, private financing of the SPR becomes an arrangement under which taxpayers allow those willing private investors to bear the risk that oil prices might not rise as quickly as the rate of interest, so that the economy as a whole can benefit from the existence of the SPR.

Decreeing that firms must hold dedicated IPR inventories, above the level they would choose to hold in an unregulated market, or mandating contributions to the SPR would force firms to bear the costs of acquisition and, in the case of decreed inventories, storage, for those inventories. Some of these costs would be passed onto consumers through price increases. However, the ability of firms to acquire and store IPR oil varies, as does their ability to pass these costs onto consumers. Thus, under such a decree or mandate, the costs of SPR development would be borne by consumers and by firms. Those costs borne by firms, however, would be disproportionately assigned to those firms that are unable to acquire and store IPR oil as efficiently as their competitors, or that lack the market power to pass IPR costs onto consumers.

These costs might be partly or fully repaid by the revenues realized upon the sale of reserve oil. If taxpayers finance the SPR, then the government would realize these revenues, and if the price of oil rises at a rate faster than the rate of interest, then no economic cost would be involved. There would be a transfer, however, from the group of current taxpayers to future ones. If firms hold IPR oil at government decree or make mandated contributions to the SPR, however, then those groups that actually bore the cost of developing the IPR (consumers and less efficient or smaller firms) might not realize the revenues resulting from its depletion.

Other Criteria

The financing options can also be measured against four other criteria:

- o Degree of Federal Control. To the extent that the SPR remains in the hands of the federal government, the option should preserve an appropriate level of federal control over reserve management, including depletion.
- o Budgetary Effects. The option should have a predictable effect on the federal budget, and should finance the SPR as efficiently as possible.
- o Speed and Level of Acquisition. The option should provide for SPR completion as rapidly as necessary.
- o Response of Producer Nations. The response of producer nations who are opposed to the acquisition of SPR oil must be assayed.

Degree of Federal Control

Another evaluative criteria for SPR funding options is the extent to which the federal government can exercise control over SPR management, including the degree of flexibility afforded the President in determining when the SPR will be depleted, how it will be allocated among refiners, and the regions and economic sectors to which it will be sent. The current SPR program--in which oil is purchased through direct federal expenditures and the President maintains drawdown authority--allows maximum federal control. This control can be exercised directly by allocating the reserve oil during a disruption. Alternatively, the control can be turned over to the private sector, by federal auctioning of the oil and allowing the market to allocate it. Both the public capitalization and debt financing proposals for SPR funding would also preserve maximum federal control over the SPR.

A more decentralized option, such as the IPR, might be preferable to the SPR in some situations, and, in general, might be an appropriate supplement to a federally controlled SPR. During small disruptions that are viewed as short term, for example, IPR options might offer more flexibility than the SPR, and the problems associated with reselling unneeded individual IPR reserves might be perceived as less severe. IPR proposals, however, would shift some control to the private sector participants.

Public Capitalization. Since public capitalization of the SPR would allow the SPR administration to deplete it (while providing for a market value transfer to SPR certificate holders from the government), no formal difficulties would exist in preserving total federal control. Moreover, possible pressure from SPR certificate holders to deplete (sell) the SPR when oil prices are highest would probably be diffused by holders' ability to sell their SPR certificates on the open market.

Debt Financing. Financing the SPR program with a targeted debt issue would change only the program's financial accounting. The federal government would likely continue controlling the storage construction, oil acquisition, and drawdown efforts. Thus, insofar as the federal government already controls the SPR program and has the power to sell bonds, debt financing of the SPR would result in little change in the government's ability to control the reserve.

IPR Options. Any of the options that would move some of the responsibility for physically storing oil to the private sector would necessarily transfer some degree of control away from the federal government. To the degree that the government relies heavily on the IPR, the loss of the control might pose problems. If, however, the IPR is considered a supplement to the federal SPR, the transfer of some control might allow a

greater range of responses to varying circumstances. Nevertheless, the use of an IPR raises several questions regarding the flexibility of the government to manage an oil interruption crisis in an equitable and efficient manner.

The pattern of shortages created by such a disruption would probably not match the across-the-board pattern of IPR inventories. Thus, some firms would be forced either to buy or to sell IPR oil among themselves. This reselling pattern raises the issue of what prices would accompany such transfers and, under the incentive arrangement, whether the government would be subsidizing a windfall to some firms.

In addition, no guarantee exists that reselling would occur in the proper amounts and directions. As a supply crisis continued and presumably deepened (following the pattern after the Iranian Revolution of 1979), prices would rise for a period of time. Thus, it is entirely possible that oil firms would receive authorization to exercise their control over IPR inventories. Those firms with large inventories could reimburse IPR oil holders (which could be the firms themselves), and then hoard or resell the inventories at a profit to firms suffering from shortfalls larger than their IPRs.

Under the circumstances just described, profiteering could occur at the expense of the IPR holders who transferred their oil to firms at a lower price under the evidence plan, or at the expense of taxpayers who subsidized the IPR's creation, should the incentive IPR plan be used. This raises the issues of what price firms would pay IPR holders for IPR oil should the government specify transactions, and whether investors would be willing to hold title to IPR oil under the evidence plan if private firm control were allowed. Some firms might be unwilling to sell or deplete their IPRs upon drawdown authorization, fearing a deepening supply crisis. This pattern was observed in 1979, as "force majeure" supply cutbacks from international major suppliers to third party buyers became common. The dispersion of the IPR, compared to the centralization of the SPR, might, therefore, make it difficult to assure equitable and efficient deliveries of reserves to refiners in need. For small disruptions, however, during which the federal government might be unwilling to draw down the SPR, an IPR could provide additional oil to help stabilize the oil market in the short run.

Mandated Contributions. Requiring firms to contribute oil to SPR facilities would allow the federal government to maintain physical control of the oil. But since the contributors would have a vested interest in the depletion of the SPR in addition to their active role in the oil market, they might attempt to pressure the SPR administrator to manage the reserve to their advantage. Also, such a plan would add oil only to the federal facilities, and not create a more decentralized emergency reserve as would

the other private IPR options. Further, it might be impossible both to mandate firms to contribute oil to the SPR and require them to develop an additional IPR. Thus, while much of the risk and burden of the reserve accumulation would be placed on oil industry firms, some of the advantages of IPRs--flexibility and efficiency during disruptions, for example--might be lost. On the other hand, requiring firms to store oil in SPR facilities would reduce the chance that firms would lower their own inventories, as they might under IPR options.

Budgetary Effects

Although storing oil for future use requires deferral of alternative economic activities, in the aggregate, this resource cost does not depend heavily on the particular financing mechanism chosen. Nevertheless, each option affects the federal budget differently, with implications which are important in current policymaking.

Public capitalization, the IPR evidence plan, a decreed IPR, and mandated contributions to the SPR would all avoid federal expenditures for the SPR, to the extent they were successful in filling it. Debt financing would have a larger budgetary effect, since the interest cost would be, in effect, equal to that now implicitly incurred under the current SPR program. Providing federal incentives to private firms to develop IPRs (through grants and tax credits) would have a potentially larger, long-term budgetary impact than does the existing program. While the costs incurred under the existing program will likely be recaptured upon depletion or dissolution of the reserve, the federal costs for providing incentives would not be recovered.

Public Capitalization. To the extent that public capitalization is successful, and private speculative demand for oil meets the needs of the SPR, such a program would make no significant direct demands on the federal budget. It would, however, divert private capital to this public purpose. In fact, should strong perceptions of oil price increases exist, the SPR administration might be able to acquire an equity share of the reserve without cost, by auctioning off certificates at a price greater than SPR acquisition costs. If public demand for SPR certificates should fall short of the desired fill rate, however, an alternate system, presumably involving federal expenditures, would have to be implemented to fill the gap. Thus, the budgetary impact of the public capitalization plan is uncertain, ranging from a net transfer of funds to the government (through acquisition of an equity share) to the cost of acquisition and storage of that amount of oil that cannot be supplied through certificate purchases. Yet the SPR certificate plan would eliminate the need for any federal expenditure for

each barrel of oil acquired by this process. Concomitantly, however, reserve depletion would yield no revenues for the government since title holders would own the value of the oil.

As stated above, demand for SPR certificates (if sold at the acquisition cost of the SPR oil) might be insufficient to fill the SPR as desired. As seen in Table 2, a 10 or 12 percent interest SPR bond (see below) would allow filling the reserve with a short-term budgetary impact equal to about one-third of the cost of direct federal purchases under the current system. Thus, if the demand for SPR certificates were less than two-thirds of the desired fill rate, and direct federal purchases had to make up the balance, the certificate plan would have a budgetary effect as large as that of the SPR bond plan. This "break-even" point between the two plans would vary with the interest rate and the price of oil.

Debt Financing. Any SPR debt instrument would create a short-term budgetary impact equal to the interest payments on the debt created to fill the reserve. Assuming a long-term interest rate of 12 percent, these costs would amount to about \$6 per barrel per year. Thus, each year in which the SPR is not depleted would require a budgetary outlay of about \$6 per barrel. It should be noted that, under any financing system, a resource cost equal to this amount would be incurred, since funds for the SPR could have been invested at the market rate of interest. Under this plan, however, this implicit cost appears as an outlay in the budget.

While a new issue of standard interest-bearing bonds would result in a relatively stable stream of income to support the SPR, linking the rate of return to some oil price indicator could make budget planning difficult. Table 2 shows the annual outlays required to service several different bonds, with various oil price assumptions. When reserve oil is financed through annual appropriations, the outlays fluctuate with the price of oil, assuming a constant purchase rate. The outlays required to service a series of fixed-yield bonds would fluctuate with the price of oil, insofar as the price of oil at a time of offering would determine the amount of borrowing necessary to finance the SPR. Thus, the amount of any interest-bearing bond offering would depend on the price of oil at the time of the offering, but, once established, the interest payments would be stable. If the rate of return of the bonds were tied to an oil price indicator, however, both the required amount of the offering and the later interest payments would vary. Table 2 shows, for example, that such an issue could require little or no interest payments during a year in which oil prices remain stable, but rather large payments in years marked by large price increases.

The figures in Table 2 are also affected by the success of the SPR bond offering. If SPR bonds bear a yield equal to the rate of oil price

TABLE 2. SIMULATED ANNUAL ON-BUDGET EXPENDITURES FOR ALTERNATIVE SPR OIL FINANCING OPTIONS (By fiscal year, in billions of current dollars) a/

Options <u>b/</u>	1982	1983	1984	1985	1986	1987	1988	Total 1982-1988
On-Budget Purchases (Oil Price Path A)	3.4	3.8	4.3	4.8	5.4	6.0	6.7	34.4
On-Budget Purchases (Oil Price Path B)	3.5	4.1	4.9	5.8	6.8	8.0	9.5	42.6
On-Budget Purchases (Oil Price Path C)	3.5	3.7	4.2	4.8	5.2	5.5	6.4	33.3
On-Budget Purchases (Oil Price Path D)	3.4	3.7	4.9	5.8	6.1	6.7	8.8	39.4
Bond, 10 Percent Coupon (Oil Price Path A)	0.3	0.7	1.2	1.6	2.2	2.8	3.4	12.2
Bond, 12 Percent Coupon (Oil Price Path A)	0.4	0.9	1.4	2.0	2.6	3.3	4.1	14.7
Bond, 12 Percent Coupon (Oil Price Path B)	0.4	0.9	1.5	2.2	3.0	4.0	5.1	17.1
Bond, Oil Appreciation Rate (Oil Price Path C)	0.5	0.0	3.4	0.0	3.2	0.0	10.0	17.1
Bond, Oil Appreciation Rate (Oil Price Path D)	0.4	0.8	6.3	0.0	2.5	3.3	21.3	34.6

a/ All options assume oil purchase rate of 200,000 barrels per day during 1982-1988. All bonds mature after 1988.

b/ Simulated oil price paths for each option are as follows: A--12 percent increase annually, 1982-1988; B--18 percent increase annually, 1982-1988; C--annual increases of 15, 0, 30, 0, 15, 0, and 30 percent, 1982-1988, respectively; and D--annual increases of 10, 10, 50, 0, 10, 10, and 50 percent, 1982-1988, respectively.

appreciation, they might not create sufficient demand to fill the SPR at the desired rate. Presumably, standard federal debt instruments (or direct federal outlays) would have to be offered to take up the slack. Thus, it might be difficult to estimate the new federal debt for budgetary purposes.

Once again, revenues would be realized upon the depletion or dissolution of the reserve. However, over a long enough period of time, the per barrel interest costs might affect the budget as much as the acquisition costs themselves. Ultimately, the depletion or dissolution of the SPR would have to cover both the acquisition costs (the principal of the debt issue) and the annual interest charges. If SPR bonds are allowed the market rate of interest and oil prices do not rise as rapidly as the rate of interest, the payment to SPR bondholders upon depletion might require federal subsidies. Conversely, if SPR bonds are denominated in the rate of oil price increase, and it proved to be higher than the rate of interest, the budget would have to absorb an unnecessary cost equal to the differential.

It should be noted, however, that under existing arrangements there is an implicit interest cost associated with SPR acquisition. Each barrel of SPR oil can be assumed to be purchased at the expense of retiring outstanding federal debt. Thus, the interest costs of SPR acquisition have to be paid, either implicitly through the federal debt, or explicitly through the debt incurred in a targeted SPR borrowing scheme. In addition to the cost of carrying the SPR debt, funds used for SPR acquisition under the current system are not available for other uses.

IPR Options. Both the decree and evidence options to build an IPR would eliminate any budgetary effect of the SPR, to the extent that they were successful. On the other hand, both of these options would entail costs for the oil industry firms forced to carry the IPR inventory. The budgetary effect of an incentives program for private IPR development is uncertain. But as long as the IPR is a genuine addition to the normal level of inventories a firm would maintain in the IPR's absence, some incentive would be required. Estimating these incentives is beyond the scope of this paper. Moreover, the desirability of a policy in which the government subsidizes the one class of actors that would profit from supply interruptions remains unclear.

The evidence plan, again if successful, would raise all funds for the IPR from the speculative demand for oil. To the extent that speculative demand is insufficient to fund a complete IPR, funds would either have to come from the firms themselves, incentives to the firms from the government, or from government acquisition. Thus, the ultimate budgetary impact of this plan is uncertain. Any of the IPR options, however, might entail a higher initial cost--that is a higher cost to society--than the federal SPR

program, because many economies of scale available to the government could not be achieved by individual firms in the private sector.

Mandated Contributions. Mandating oil industry firms to contribute oil to the reserve would transfer the burden of oil purchase costs from the federal government to the firms. The degree to which the government compensates the contributors prior to drawdown would determine the budgetary impact. If, for example, the government were to issue certificates upon receiving oil, the certificates could be treated as they would be in the public capitalization plan, and have no effect on the federal budget. Alternatively, should the government pay the carrying costs of the oil, the short-term budgetary effect would be comparable to that of debt financing the oil purchases. In the long term, and upon depletion, the budgetary impact would depend on the degree to which the government allowed the firms to capture the benefits of oil prices increases.

Speed and Level of Acquisition

All proposals for SPR financing must be evaluated by the speed and level of acquisition they could provide. This section evaluates the four proposals in this light. Neither public capitalization of the SPR, nor debt financing tied to the price of oil, nor the evidence plan would guarantee rapid completion. Debt financing, at the market rate of interest, would offer a strong probability of SPR completion.

Oil acquisition depends, in part, on whether sufficient storage capacity exists. Plans now exist for creation of 400 million barrels of SPR capacity by 1985. New capacity beyond this amount can be obtained from three sources. New centralized facilities, such as the current salt dome storage, could be constructed. Above-ground storage could be constructed more rapidly than salt dome storage, but at greater cost. Existing capacity that is slated for retirement or scrappage could be renovated. Of the three options, the third might be the least expensive, but limited in volume.

Virtually all of the SPR financing options could be fitted to any of these storage types. Under the public capitalization or debt financing plans, the SPR administration could employ any of these storage mechanisms, depending on the amount of storage needed and the time available to obtain it. Similarly, any of the IPR options could be implemented through private storage or through centralized storage, although an IPR held in salt domes would not have the decentralized character its proponents find attractive.

Public Capitalization. Public capitalization of the SPR would not guarantee speedy completion. Offering SPR certificates at a cost equal to

the price of SPR oil when acquired, plus a service fee to cover administrative overhead and/or storage costs, would not guarantee their sale. Public demand for SPR certificates might fall short of the desired fill rate. If this happened, this rate could be achieved only by lowering the price of the SPR certificates below the price at which the SPR is entirely self-financing, or by allowing a government entity to purchase SPR certificates. In either case, federal flexibility in the speed and level of SPR acquisitions could not be maintained except with budgetary cost.

Conversely, the demand for SPR certificates could exceed the rate at which the SPR could be completed. This might happen if the public perceived an imminent need to use the SPR; for example, a rush into SPR certificates could have occurred had this option been in effect in recent months, as the Iraq-Iran war developed. In this case, however, the excess demand could be solved through auction.

The sale of additional certificates after the issuance of the initial group could present another problem. The first group of certificates would be sold, as stated, at a cost necessary to make the SPR self-financing. If there should be any initial appreciation in the value of these certificates, they should command a higher price than would new certificates at issuance. But, issuance of (presumably) lower-priced annual certificates would continually depress the resale value of existing certificates toward the current price needed to acquire and fund the related costs of SPR oil. The full speculative potential of SPR certificates would not be realized, therefore, until the SPR was completed and new certificates were no longer issued.

One possible arrangement to avoid this problem would be to issue new SPR certificates at the actual market price for existing ones. If the market price of SPR certificates exceeded the market price of oil, the SPR administration would receive revenues in excess of oil acquisition and related costs for each new certificate sold. The SPR administration could buy its own certificates with this profit. Thus, the government could develop its own equity interest in the SPR out of the profits of SPR certificate sales, and receive payment upon depletion like any other certificate holder. Under this variation, purchases of SPR oil would depend on the total revenue received for SPR certificates, rather than the number of certificates sold.

A transient glut of world oil supplies could also make it difficult to sell SPR certificates. The existence or expectation of a soft market, most likely during a protracted recession, would depress the resale value of existing SPR certificates below the price at which new certificates were issued. Potential buyers of SPR certificates would then shift from new certificates to existing ones. This would interfere with the completion of

the reserve, and would, again, drive the price of SPR certificates towards the price and acquisition costs of new SPR oil. To attract more investors, new issues could be discounted and the equity that already exists in the 121 million barrels now in the SPR could be sold in order to realize enough funds to continue SPR acquisition during the glut period.

Debt Financing. Debt financing of the SPR at a market rate of interest would offer the greatest flexibility in the rate and level of SPR completion, unless the SPR administrative entity was constrained by a debt limit that restricted purchases. If SPR bonds were offered at the market rate of interest, adequate financing should be available. If the bonds were offered a rate of return tied to the rate of appreciation of oil prices, however, the adequacy of financing would be more uncertain. Financing would then be dependent on public perceptions of oil's future appreciation, as would be the case under public capitalization. Thus, during a transient soft oil market, financing tied to the rate of oil price appreciation could result in insufficient revenues for SPR purchases. Alternatively, queues might form for SPR bonds when perceptions of oil price appreciation are strong.

Yet, on average, unconstrained debt financing offers a strong likelihood of achieving the desired speed and level of SPR completion, particularly if SPR bonds are offered at a competitive rate of return. However, this flexibility might be achieved at the expense of a larger direct budgetary impact, as is discussed above.

IPR Options. Options for developing an Industrial Petroleum Reserve vary in their ability to complete a reserve on a timely basis. A DOE decree to maintain an IPR would lead to compliance problems because of the propensities of firms to count "tank bottoms" and other unusable inventory as IPR. In addition, the financial burden of carrying such an inventory is substantial. The annual interest cost alone of maintaining a 188 million barrel inventory (equal to approximately 3 percent of annual demand and sufficient to allay a shortfall of 1 million barrels per day for six to seven months) could range between \$0.7 and \$1.1 billion. In addition, storing such amounts would call for the construction or renovation of storage facilities. Some firms might weigh penalties for noncompliance against these costs. The potential rate of construction of new facilities is limited. In addition, some firms may reduce ("back out") their own inventories in the knowledge that their needs, should a supply disruption occur, could be met through their IPR inventory.

Federal incentives, through tax credits, grants, or loan guarantees, could result in a prompt filling of the IPR. Yet the magnitude of the incentives that the government would have to offer is unclear. Moreover,

should "backing out" occur, subsidization of an IPR might be tantamount to a limited subsidization of normal inventories.

On the other hand, incentive options would bring new facilities on-line efficiently. The installed storage capacity of SPR is slated to rise to 300 million barrels by fiscal year 1983, less than half of that authorized by the Congress. To achieve a SPR larger than 300 million barrels quickly, above-ground storage would have to be built. An incentives program for an IPR would allow for this expansion, by inducing renovations of marginal storage facilities. Offering an incentive to create new storage facilities (through construction or renovation) equal in value to the per unit cost of SPR storage would rationalize the combined public-private storage system. It should be noted, however, that marginal private-sector storage capacity could be acquired by the SPR administrative body under any other filling arrangement.

The rate of acquisition under the evidence plan, like that of the public capitalization plan, would depend on the willingness of the public to hold oil as a speculative asset. Under the evidence plan, individuals would store oil for one-year terms, granting specific firms the right to claim the oil should an IPR depletion be announced. Should this speculative demand be insufficient, firms would have to pay for their inventories themselves, or subsidize the speculative purchases of individuals. This would once again raise the problem of firms' differing abilities to finance such an inventory.

Finally, under the evidence plan, firms might receive the right of control from the government to utilize IPR oil during a crisis. This "less than arm's length" relationship between a firm and its oil might create the strongest incentives among any SPR or IPR options for firms to reduce their conventional inventories.

Mandated Contributions. Requiring firms to contribute oil to federal SPR facilities, with appropriate noncompliance penalties, would probably assure continued filling of the SPR. The likelihood of completion and the rate of oil acquisition would depend on the requirement placed on industry. Requiring a contribution level commensurate with an aggressive oil acquisition program might be difficult to enforce and might place excessive burdens on the industry. Since firms vary in their ability to pass on the costs to consumers, such requirements would place some firms at a competitive disadvantage within the industry. Further, if such requirements applied only to crude imports, they would provide the incentive to import petroleum products rather than crude oil, effectively subsidizing foreign refiners. Finally, setting a level of contributions according to some historical import level might have adverse effects during periods in which the world oil market changes. During an abrupt tightening of oil supplies,

for example, requiring these contributions might exacerbate isolated shortages and price increases. Some degree of flexibility in the requirement might, therefore, be necessary to allow for these fluctuations. On the other hand, maintaining strict requirements tied to import levels would tend to provide greater contributions to the SPR and a larger stockpile during periods of high levels of imports, when a larger stockpile might be desirable.

Producer Nation Response

A problem common to all financing options to fill the SPR rapidly is the political opposition of producing nations, notably Saudi Arabia, to the reserve's completion. The SPR and IPR options differ in that oil for the SPR is purchased by the federal government, while the IPR is filled by private firms and individuals. The issue of producer nation response, therefore, centers around which of these two groups, governments or firms, is less vulnerable to retaliation by dissatisfied producer nations.

Both firms and governments offer advantages and disadvantages as Strategic Reserve procurers. Because of their regular pattern of crude purchases, firms are thought to be able to make purchases that could be diverted to the reserve without detection. In the long run, however, undetected diversion is unlikely. "Destination" contracts are becoming more common as state-owned firms in the OPEC nations take over crude sales. These contracts stipulate crude destinations, and diversions would constitute an abrogation of contract. Moreover, firms that now find their direct access to crude oil increasingly restricted might be reluctant to endanger their existing supply relationships.

Governments, of course, are obvious SPR purchasers, and thus are at an immediate disadvantage relative to firms. But governments have the advantage of being able to tie political considerations to SPR purchases, or offer countervailing benefits, such as military sales and trade concessions. Thus, governments might be able to overcome the political obstacles to filling the SPR, while firms could only attempt to maneuver around them.

The problem of political opposition, most importantly by Saudi Arabia, cannot be resolved by simply restructuring the mode of SPR procurement. Rather, the appropriate approach to overcome such opposition is probably to address its root causes. Producer nations fear that the SPR would be used as a "buffer stock" to manipulate prices in nonemergencies, and that a completed SPR would compromise the United States' commitment to the political stability of the moderate Persian Gulf states. Direct assurances on these matters and political concessions may be necessary if the SPR is to be filled without adding to the animosity between producing and consuming

nations. ^{5/} Moreover, Saudi objection to the SPR may be qualified if the oil market becomes slack, and SPR purchases help maintain oil demand and prices at levels desired by Saudi Arabia and other producers.

LEGISLATION TO REDUCE FEDERAL SPR COSTS

In response to recent efforts to reduce the federal deficit, much Congressional attention has focused on methods to reduce the federal SPR expenditures by several billion dollars annually. Two recently introduced bills, discussed in this section, would attempt to do this by shifting all or part of the costs to the private sector.

Private Equity Petroleum Reserve Act

On March 4, 1981, Congressman Gramm introduced H.R. 2304, the Private Equity Petroleum Reserve Act (PEPRA). By amending the Energy Policy and Conservation Act, the bill would finance the SPR through speculative private investment.

The bill authorizes the Secretary of Energy to issue to the public negotiable certificates, denominated in barrels of oil. The offering price of these certificates would be, on a per barrel basis, no less than the average weighted price of crude oil imported into the United States during the quarter preceeding the date of issue. The proceeds of certificate sales would be used for acquisition of crude oil for the SPR. Excess funds--generated by either premium prices realized for certificates, or from the sale of certificates backed by oil already in the SPR--would be deposited in the general fund of the Treasury as miscellaneous receipts.

The certificates would be issued for a term of 10 years, at which time they could be redeemed or rolled over. Prior to maturity, holders could transfer certificates, presumably through sale on a secondary market. The Secretary of Energy could call in certificates, but only in the event of reserve drawdown. The redemption value of certificates, at maturity or early retirement, would depend on the prevailing price of crude oil, reduced by certain storage and handling costs. The bill also provides for redemption

^{5/} This issue may become more important after the Iraq-Iran War. Iraq's demonstration of military strength will probably motivate the Saudis to accelerate their acquisition of military equipment, in an effort to ensure their defense and promote a "balance of power" within the Gulf region.

by lottery should too few or too many holders request retirement during a drawdown.

The bill excludes SPR oil from price controls and certain transportation restrictions. It also mandates an increase in the fill rate from 100,000 to 200,000 barrels per day beginning after September 30, 1981. Further, the bill sets a trigger for reserve drawdown, prohibiting the use of the reserve unless oil supplies are reduced by 10 percent or more of projected daily demand.

As introduced, the bill employs some of the elements of a public capitalization plan, and provides methods to reduce some of the problems associated with such a plan. Yet some problems remain unsolved. While the price control exemptions might be necessary for attracting investors, for example, selling SPR oil at uncontrolled prices during a disruption might cause allocation problems if other domestic prices were controlled. In addition, until other details are worked out--such as restrictions or limitations on the size of allowable investments--the financial implications of market competition for funds remain unclear. Further, the bond's relatively long maturity of 10 years might frustrate the efforts of other borrowers, including the Treasury, to lengthen the maturity of their debt issues. Finally, the bill allows the immediate sale of certificates backed by oil already in the reserve. While the sale of shares representing this oil would generate substantial receipts if successfully sold, the immediate sale of these shares would give the SPR administrator less future flexibility. If the oil in the SPR is kept in the name of the U.S. government, it would provide an equity buffer, should the program later encounter financial or technical difficulties.

Strategic Petroleum Reserve Amendments of 1981

On March 12, 1981, Senator Kassebaum introduced S. 707, the Strategic Petroleum Reserve Amendments of 1981. The bill mandates that each importer of more than 75,000 barrels per day must contribute oil to the reserve. It sets the annual amount of oil to be contributed at five times the average daily amount imported. In return, the federal government would pay an annual fee to each contributor for a period of 11 years, equal to 10 percent of the purchase price of the oil contributed. In the event of an emergency drawdown, the contributors would receive either oil or a payment for the oil. The payment would be equal to the world market price at the time of distribution, less the amount of fees paid until that time, but not to exceed the average world market price of the three months immediately preceding the date of distribution. This three-month lag might give firms fewer revenues from SPR sales than they would receive if paid the price prevailing at the time of depletion.

The bill is unclear about whether the government or the firms would own the oil after the 11 years, since it omits any reference to the treatment of the oil after this period. Section 173 stipulates, "all rights, title, and interest to the amounts of crude oil contributed . . . shall remain with the importer of such crude oil." This statement might apply only to the 11 years that the oil is held, during which time the annual fees would be considered installments on the purchase price of the oil. Thus, after 11 years, the oil would belong to the government. "Buying" the oil on this type of installment plan appears to place a serious burden on the importers. The federal government would be forcing the contributors to provide the oil, and a very low interest loan (about 1 percent annually) on the oil.

A strict interpretation of the language, however, may indicate that the oil would revert to the firms, as stated in Section 173. Thus, the federal government would burden the importers with the cost of the oil in the short term, but not the carrying charges. The 10 percent annual fee would then be a payment for the interest charges required to cover the debt for the oil cost.

The Kassebaum bill has the disadvantage of imposing the financial risks of the SPR on the importing firms. Yet, while the bill forces firms to assume these risks, it would not create a decentralized, privately held reserve to complement the SPR. Keeping firms' reserves in the SPR salt dome facilities would, however, reduce the chance that firms would lower their own conventional inventories. The contributing firms might pressure the SPR administrator to manipulate the stockpile to their advantage, since they have both a vested interest in the reserve management and an active role in the oil market. The bill also ignores importers of other petroleum products, effectively subsidizing foreign refiners.

The Kassebaum proposal has the advantage of complementing the current SPR procurement program at minimal cost to the federal government. As introduced, S. 707 could result in the addition of about 25 million barrels of oil to the SPR per year. Crude oil import levels currently run at about 5 million barrels per day, but not all importers would be required to contribute. This bill, if passed, would save about \$1.0 billion in fiscal year 1982.

CHAPTER IV. RELATED ISSUES

In addition to the criteria employed in Chapter III to evaluate SPR financing arrangements, some related issues must be kept in mind. This chapter addresses the following subjects:

- o The design of the SPR financing method and its effect on capital markets;
- o The advantages and disadvantages of retaining the SPR program within the Department of Energy; and
- o How the reserve would be depleted or terminated under each of the alternative financing arrangements.

EFFECTS OF SPR SECURITY STRUCTURE ON THE CAPITAL MARKET

Like any other asset, SPR securities must compete for investors. The asset market is very diverse, and the Congress, in designing SPR securities, will need to determine where, in the market, the securities would compete.

SPR securities can take the form of interest-yielding bonds, bonds based on oil prices, or certificates. Interest-yielding bonds are indistinguishable from other bonds with identical terms and yields. This type of SPR bond would compete directly with other bonds--notes and bonds issued by the U.S. Treasury, state revenue bonds, and utility and corporate bonds. Sales of SPR bonds could displace sales of these other bonds, possibly forcing institutions to raise interest rates in order to finance their required level of debt. Although some industrial borrowing is still done in the bond market, uncertain expectations of inflation have reduced this borrowing dramatically. To the extent that revival of long-term private bond markets are required for accelerated capital formation, competition from SPR bonds might be undesirable. 1/

SPR securities tied to the rate of oil price appreciation would be far more speculative than fixed-yield securities. They would be competitive

1/ For comparative purposes, note that the \$45 billion required for SPR completion equals about 8 percent of the outstanding Treasury notes, bills, bonds, and savings bonds.

with the common "inflationary hedges"--gold, real estate, mineral and agricultural futures--rather than government or private securities. The position of any SPR security in capital markets also depends on the minimum required investment. Marketing SPR securities in small denominations would make them competitive with savings accounts, the predominant source of mortgage funds. Larger denominations, however, might preclude smaller investors from taking advantage of the new investment vehicle.

RETAINING THE SPR PROGRAM WITHIN DOE

An additional issue with regard to the structure of the SPR is whether or not the program should remain within the Department of Energy (DOE). It is not the intention of this paper to evaluate DOE's conduct as administrator of the SPR program. Rather, this section outlines the general advantages and disadvantages of maintaining the SPR within DOE.

Rationale for Establishing a New SPR Entity

As described earlier, the SPR program to date has not been entirely successful. The program appears to have been the victim of political pressure, both domestic and international, and may be subjected to future financial constraints. Therefore, proposals have been discussed that would create a new and separate organization, outside DOE, to manage the purchase of oil for the reserve.

The primary advantage of moving the SPR program outside DOE is to provide some level of independence from the political pressures of the federal government and the operational constraints imposed by agency rules and regulations. If the SPR should be filled using private financing, for example, not only would the independent corporation have greater management flexibility, but funds from the private sector might be more easily generated. Independence would assist in convincing the private sector the SPR program was permanent and free from political interference. Further, an independent entity might be able to attract expert management without some of the Civil Service restrictions on hiring and salaries. The federal system of controls might tend to minimize abuse more than promote efficient operation and goal achievement. Avoiding these constraints might allow a more rapid and efficient SPR buildup.

In recent years, increasing numbers of government-sponsored enterprises, autonomous agencies, and public corporations have been created, the most recent of which is the Synthetic Fuels Corporation. While the intended purpose of creating a new entity to manage the reserve buildup is to allow

operational independence from the federal government, political and fiscal accountability might suffer.

The corporation would be, to some degree, insulated from close Congressional and Administrative control. Such insulation might not always be desirable. Coordination between the corporation's activities and national policy goals might at times be difficult to achieve, and the independent agency may not be responsive to the needs of the federal government. The tradeoff between independence and accountability dominates the debate over what type of entity to establish to manage the purchase of SPR oil.

Compatibility of SPR Administration and Program

The choice of entity to administer the SPR is, in part, dependent on the financing option employed to fill the reserve. Both public capitalization of the SPR and issuance of an SPR debt instrument would call for a direct inflow of private funds. This inflow would depend, to a large extent, on the confidence that private investors place in the SPR administration. Thus, investors must be assured that the SPR would actually be filled efficiently, that it would be sold at a market price, and that no special ex post taxation would be placed on SPR sales. These assurances are difficult to give.

Fair returns on SPR oil might be jeopardized by special legislation requiring the sale of SPR at subsidized or controlled prices. Previous legislation that has employed oil and other fuel prices as a redistributive device--such as oil price controls--might suggest to potential investors that the SPR would also be treated in such a fashion. Thus, the SPR might have to be insulated from the political process to inspire private confidence in the future financial rewards of the program. Creation of a separate SPR entity might achieve this goal. It should be noted, however, that a tax of the "windfall profits" type could still be levied on SPR earnings, despite the administrative form of the SPR.

IPR options might call for different administrative procedures. If a decree approach was used, then the federal role in the SPR would be limited to determining the required size of the IPR and inspection for compliance. These activities might be best carried out within DOE or the Internal Revenue Service (IRS), which maintain a variety of contacts with all oil industry firms, and have the infrastructure necessary to perform this role. If incentives were used to build the SPR, then the administrative role would again be limited to inspection for compliance, which DOE or IRS could perform. In either event, decree or incentive approaches to the IPR might eliminate the need for a separate SPR administration.

The evidence plan, if successful, would call for an inspection and compliance role for the federal government, like other IPR options. It is unclear, however, that the evidence plan would result in a reserve of the desired size (a disadvantage it shares with public capitalization and with oil price-denominated SPR bonds). In any of these plans, should the rate of SPR or IPR acquisition fall short of its goal, back-up financing would be required. Under these circumstances, either an independent SPR entity or a DOE administrator might require public funds to complete the SPR.

DEPLETION AND TERMINATION

Private financing plans involving SPR securities based on oil price appreciation would create a set of claims upon either depletion (as part of a response to an emergency) or termination (determining that the SPR was no longer needed). Both would involve the transfer of billions of dollars. This section describes the issues involved in depletion or termination of the reserve.

Depletion

Price Controls. Emergency depletion of the SPR will occur in a recessionary economic environment, presumably amid great uncertainty and conflict among income claimants. There might be a strong temptation to control oil prices in such an atmosphere. In the next several years, a U.S. shortfall of 1.0 million barrels per day could result in a sudden price increase of \$20 per barrel. ^{2/} Moreover, if the disruption that catalyzed sudden oil price ratchets was clearly temporary, short-term oil price controls might preclude the large income transfers that distort the economy and reduce purchasing power dramatically.

Yet, the possibility of price controls on SPR sales would probably dissuade all potential purchasers of SPR securities. Controls and private financing might be compatible if SPR investors were given contractual guarantees of the equivalent of the world market price of oil upon depletion, rather than being given receipts of SPR oil sales per se.

Reference Prices. Guaranteeing the equivalent of the world oil price raises the issue of the reference price for SPR sales. If SPR oil is sold by auction, payment to SPR investors could be calculated by prorating receipts.

^{2/} See Congressional Budget Office, Managing Oil Disruptions: Fees and Tariffs (forthcoming 1981).

If SPR oil is sold at a price other than that established by this type of competitive process, some reference price would be required. The average price of U.S. imports during the week of transaction could provide a reference. Spot prices could also be employed. The choice of a reference price, presumably made before obligations are entered into, would affect the demand for SPR securities, given the characteristic pattern of higher spot prices during disruptions.

Tax Treatment. The treatment of any SPR security under the U.S. tax code must be established before any public offering. The attractiveness of an investment depends heavily on its tax treatment. For example, the demand for SPR securities would reflect whether deferred interest payments would be subject to a capital gains tax or taxed as ordinary income. In addition to altering the attractiveness or price of a SPR security, such decisions would affect the level of federal subsidy through tax expenditures.

Termination

If the SPR is not depleted during the term of SPR securities, these securities would have to be retired or rolled over. It might also happen that the SPR was never depleted, and the reserve would have to be terminated. This section discusses the termination of the reserve under alternate financing options.

SPR Certificates. Under the SPR certificate plan, termination would involve the sale of the SPR oil and compensation to certificate holders, determined by the sale price of the reserve. This price would be influenced by the rate at which the SPR was depleted--the slower the depletion, the smaller the depressing impact on oil prices. Moreover, investors might eventually be wary of SPR certificates if the federal government retained the power to determine when the SPR would be terminated. A maturation date might have to be assigned to SPR certificates to provide a measure of certainty on this score. Maintaining the SPR beyond the maturation date would require marketing all SPR certificates again. Once again, if demand for these certificates was insufficient to maintain the reserve at the desired level, some new source of financing would be required, or a smaller SPR accepted.

SPR Bonds. Like SPR certificates, SPR bonds might require some maturation date. Such a termination date would allow for an examination of the need for the reserve after that period of time. A decision to maintain the SPR after its securities mature would require rolling over SPR bonds. It is unclear that demand would exist for these bonds if they were denominated by the rate of oil price appreciation. Thus, continuing the SPR at that time

might require federal expenditures. If SPR bonds were denominated by the market rate of interest, it would likely be fairly simple to refinance the reserve.

IPR Options. In the cases in which an IPR is mandated, created by incentives, or contributions decreed, terminating the reserve would require eliminating the mandate or eliminating the incentive. Unlike under SPR certificates or bonds, however, which would be rolled over and, hence retired in a series of annual waves, the elimination of IPR requirements or incentives could free up the entire IPR at once. This would add substantially to oil market volatility. Under the evidence plan, termination would leave IPR title-holders with oil rather than receipts. Since firms would no longer need to find individuals to hold speculative oil, firms would be forced to find new buyers for their oil. Moreover, as is the case under the mandated IPR and incentive IPR plans, termination of the evidence IPR might, by releasing the entire IPR at once, create some temporary market instability. The problems of a disorderly market could be reduced, however, by a gradual phasedown of the IPR storage requirements or incentives.

