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BY THE COMPTROLLER GENERAL

# Report To The Congress

OF THE UNITED STATES

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## The Strategic Petroleum Reserve: An Overview Of Its Development And Use In The Event Of An Oil Supply Disruption

The Congress authorized the Strategic Petroleum Reserve in 1975 to store up to 1 billion barrels of oil that could be withdrawn from storage and distributed to replace lost imports if U.S. oil supplies were disrupted. After expenditures of nearly \$18 billion, the Reserve is expected to contain about 489 million barrels of oil by September 30, 1985.

Over the past several years, GAO has reviewed and reported on several aspects of the Reserve's activities. GAO found that:

- Oil purchases for the Reserve have generally been cost effective to the government.
- Management of the Reserve during its early years resulted in a wide range of problems.
- The use of the Reserve during an oil supply disruption could be restricted by the Department of Energy's capability to withdraw oil from the Reserve and by pipeline and marine terminal limitations until planned improvements are completed.

Because of the federal deficit and the current world-wide oil surplus, Energy's fiscal year 1986 budget proposed an indefinite moratorium on future Reserve activities after fiscal year 1985. GAO's analysis of this proposal showed that serious consideration should be given to continued development of storage facilities with oil acquisition to be based on availability, price, and budget considerations. The Congress subsequently provided for continued development and fill in fiscal year 1986.



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COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON D.C. 20548

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To the President of the Senate and the  
Speaker of the House of Representatives

Over the past several years, we have reviewed and reported on several aspects of the Strategic Petroleum Reserve's activities. We undertook these reviews because the Reserve serves as the cornerstone of the domestic energy emergency program for reducing the United States' vulnerability to foreign oil supply disruptions. This report summarizes the results of our work to date. It discusses the current status of the Reserve's development, its management, alternative development strategies, and its ability to mitigate the economic effects of an oil import disruption by withdrawing, selling, and distributing oil stored in the Reserve.

Copies of this report are being sent to appropriate House and Senate committees, the Secretary of Energy, the Secretary of Defense, and other interested parties.

A handwritten signature in black ink that reads "Charles A. Bowsher".

Charles A. Bowsher  
Comptroller General  
of the United States



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**EXECUTIVE SUMMARY**

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The Strategic Petroleum Reserve, designed to reduce United States' vulnerability to foreign oil supply disruptions, serves as the cornerstone of the domestic energy emergency program to mitigate the economic effects of such a disruption. Since 1975, the Congress has appropriated about \$17.8 billion for the Reserve. As of July 31, 1985, the Reserve contained about 483.5 million barrels of oil. This represents about 107 days of current net U.S. imports.

Because of the Reserve's importance and prior management problems that could adversely affect its usability, GAO addressed whether

- the day-to-day operations and management of the Reserve could be improved;
- the stored oil can be withdrawn, distributed, and sold in the event of another oil disruption; and
- the Reserve's oil acquisition methods and procedures have been adequate.

Because the Department of Energy's fiscal year 1986 budget proposed a moratorium on Reserve development and oil fill, GAO analyzed alternative development strategies for the Reserve.

The information presented in this report summarizes and builds on the results of 26 issued GAO products.

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**BACKGROUND**

The oil supply disruption of the 1970's caused severe economic distress. The Congress, in 1975, authorized creation of a Reserve to store oil that could be withdrawn from storage and distributed to replace lost imports if U.S. oil supplies were disrupted.

The Department of Energy, which is responsible for developing and operating the Reserve, has been implementing a three-phase plan to develop a 750-million-barrel Reserve at six storage sites in Louisiana and Texas.

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**EXECUTIVE SUMMARY**

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In part as a response to reducing the federal deficit, Energy's fiscal year 1986 budget proposed an indefinite suspension on both oil acquisition and the development of facilities at the end of fiscal year 1985 when the Reserve will contain 489 million barrels of oil. (See pp. 4 to 7.)

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**RESULTS IN BRIEF**

Management of the Reserve during its early years resulted in a wide range of problems that have, among other things, caused uncertainties about the actual rate at which Reserve oil can be withdrawn (drawn down). In addition, delivery of Reserve oil to users is limited by existing pipelines and marine terminals.

On the other hand, Energy's oil purchases have generally been cost effective to the government. On a few occasions, however, more flexible procurement practices could have reduced acquisition costs somewhat.

GAO's analysis of alternative Reserve sizes indicated that a Reserve larger than 489 million barrels should be seriously considered.

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**PRINCIPAL FINDINGS****Reserve Management**

Because of Energy's early efforts to develop storage capacity and fill the Reserve as quickly as possible, inadequate management attention to other aspects of the Reserve led to problems with the development of drawdown-related systems and equipment; controls over contractors' activities; and internal financial controls over disbursements, receivables, and collections. Energy has taken some corrective actions, such as focusing attention on resolving systems and equipment problems that could affect drawdown. (See pp. 40 to 55.)

**Oil Withdrawal**

Energy established an oil drawdown and distribution objective of 3.5 million barrels per day to be achieved when phase II is completed in 1987. Energy asserts that this objective can be met based on a computer simulation that predicts the drawdown rate that can be achieved; equipment performance during storage site development; and 1-day drawdown exercises at three storage sites.

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**EXECUTIVE SUMMARY**

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However, technical and operational problems, such as corrosion in the Reserve's piping, could affect drawdown capabilities. GAO therefore questions the assumptions underlying Energy's assertions that the drawdown rate can be achieved. Also, distribution limitations will continue until Energy completes planned pipeline and marine terminal improvements in 1987. (See pp. 27 to 39.)

**Oil Acquisition**

Oil acquisition costs for the Reserve are about \$15 billion. Energy's purchases of Mexican oil, rather than comparable oil from the Arabian Gulf, have generally reduced overall acquisition costs through transportation savings. In addition, purchases on the spot, or short-term, market generally were fair and reasonable. However, acquisition costs could have been reduced by about \$1.9 billion by allowing exceptions to acquisition procedures. (See p. 5 and pp. 14 to 26.)

**Alternative Development Strategies**

Energy's proposed moratorium on both oil acquisition and facilities development was expected to reduce federal spending by \$8.1 billion over a 5-year period. GAO's analysis of the proposal to stop the Reserve at 489 million barrels and of alternative Reserve sizes, however, showed that while a 489-million-barrel Reserve required the lowest level of expenditures, only a small portion of the planned budget reduction would be realized by stopping development of new storage facilities--\$576 million compared to \$7.6 billion for stopping oil purchases. A larger Reserve would increase oil availability and drawdown capability and could increase the price-dampening effects of expected oil price increases during a disruption. GAO suggested that serious consideration should be given to continued development of facilities for a 750-million-barrel Reserve, filling it to the 500-million-barrel level, and keeping subsequent oil fill rates flexible. The Congress did not accept the proposed moratorium and in August 1985 made appropriated funds available for continued facilities development and for filling the Reserve up to 500 million barrels by the end of fiscal year 1986. (See pp. 56 to 61.)

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## EXECUTIVE SUMMARY

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### RECOMMENDATION

GAO is making no new recommendations. Its recommendations on the Reserve program that appeared in other reports and agency responses to them are discussed in this report.

### AGENCY COMMENTS

The Departments of Energy and Defense, which purchased most of the Reserve's oil, reiterated certain of their comments made on various earlier GAO reports. Because Energy and Defense believe that current acquisition procedures allow the appropriate consideration of the relative value of different quality oil being offered for purchase, they reject GAO's proposal that minor exceptions be considered. GAO, however, continues to believe that consideration of such exceptions has merit because (1) acceptable price ranges for different quality oils cannot be established with precision and (2) purchases of lower priced but acceptable quality oil that exceed its price range by a small amount, instead of a higher quality oil falling within its price range, could reduce total costs.

Energy disagreed with GAO's concerns over the Reserve's drawdown capability, stating that there is sufficient evidence to support a conclusion that the design rates can be achieved and sustained over an extended period. Energy cited as examples its recent results of computer simulations of drawdown operations and analyses of equipment performance during storage site development. GAO revised the report to reflect this information, recognizing that these activities provide an indication of Energy's drawdown capability. GAO, however, does not place as much confidence as Energy in planned actions to correct noted problems and achieve phase II design performance levels. This stems from GAO's observations of the history of problems at the sites and the lack of attention to some of the noted technical problems. Thus, GAO believes that until the corrections are actually made and the system is fully tested at design levels, uncertainty will remain in Energy's ability to achieve and sustain phase II drawdown rates. Energy also provided editorial and technical comments that have been incorporated into the report where appropriate. (See pp. 26, 38, 55, and 60 and apps. II and III.)



## C o n t e n t s

		<u>Page</u>
	EXECUTIVE SUMMARY	i
	CHAPTER	
1	INTRODUCTION	1
	Objectives, scope, and methodology	1
2	HISTORICAL PERSPECTIVE AND STATUS OF THE SPR	4
	SPR facilities	6
	SPR oil fill rate	10
	Responsibilities for the SPR	12
3	SPR OIL ACQUISITION METHODS AND PROCEDURES HAVE BEEN REASONABLE	14
	DOE's oil acquisition methods have been reasonable	14
	DFSC's purchase procedures generally assured fair and reasonable prices at lowest overall cost	18
	SPR oil prices compared with oil company prices	21
	Cargo preference compliance increases oil acquisition costs	23
	SPR oil accountability	24
	Conclusions	25
	Agency comments	26
4	SPR USE DURING AN OIL INTERRUPTION MAY BE RESTRICTED BY DRAWDOWN AND DISTRIBUTION CAPABILITIES	27
	The SPR's ability to draw down oil at design rates is uncertain	27
	Drawdown rates are constrained by limited distribution capability	34
	DOE's proposed distribution method-- price-competitive sales	36
	Conclusions	37
	Agency comments and our evaluation	38
5	EARLY MANAGEMENT PRACTICES AT THE SPR WERE NOT EFFECTIVE, BUT IMPROVEMENTS ARE BEING MADE	40
	Project management weaknesses during the SPR's early years affect drawdown capability	40
	DOE had not effectively controlled contractor activities	44
	Internal controls over disbursements, receivables, and collections were weak	46
	DOE recognized need to improve SPR management	48

CHAPTER		<u>Page</u>
	Management, operation, and maintenance contract to be used at SPR	50
	Conclusions	54
	Agency comments and our evaluation	55
6	IMPACTS OF A MORATORIUM AND FUTURE DEVELOPMENTAL STRATEGIES	56
	Alternative SPR sizes	57
	Effect of moratorium on NPR revenues	57
	Costs of alternative SPR sizes	57
	Benefits of a larger SPR	59
	Recent and pending legislation	60
	Conclusions	60
	Agency comments and our evaluation	60

#### APPENDIX

I	GAO reports and testimony on the SPR	62
II	Advance comments from the Department of Energy	64
III	Advance comments from the Department of Defense	67

#### ILLUSTRATIONS

Figure 2.1:	SPR cumulative funding, fiscal years 1976-85	5
Table 2.1:	SPR storage capacity	7
Table 2.2:	Planned SPR oil storage as of September 30, 1985	7
Figure 2.2:	The Strategic Petroleum Reserve System	9
Table 2.3:	SPR oil inventory and fill rates	10
Table 3.1:	The SPR program's compliance with the Cargo Preference Act	23
Table 4.1:	Planned oil level and design drawdown capability by phase of development	28
Figure 4.1:	Drawdown process at a typical SPR salt cavern site	29

#### ABBREVIATIONS

COTR	Contracting officer's technical representative
DCAA	Defense Contract Audit Agency
DFSC	Defense Fuel Supply Center
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
FEA	Federal Energy Administration

GAO	U.S. General Accounting Office
ILS	Integrated logistics support
MOM	Management, operation, and maintenance
NPC	National Petroleum Council
NPR	Naval Petroleum Reserve
OCS	Outer Continental Shelf
OPEC	Organization of Petroleum Exporting Countries
PEMEX	Petroleos Mexicanos
SPR	Strategic Petroleum Reserve



## CHAPTER 1

### INTRODUCTION

The oil supply disruption of the 1970's demonstrated the severe economic distress that can occur when U.S. imports are threatened or are actually reduced. In 1975 the Congress, concerned about the effects of oil import disruptions, authorized a Strategic Petroleum Reserve (SPR) to store up to 1 billion barrels of oil. The SPR, currently the primary component of the U.S. domestic energy emergency preparedness program, has assumed particular importance because it has the potential to mitigate the adverse economic effects of another oil disruption. To this end, about \$17.8 billion has been appropriated thus far for SPR development and oil purchases. As of July 31, 1985, about 483.5 million barrels of crude oil were stored in the SPR.

Over the past several years, we have reviewed and reported on various aspects of the SPR activities. As discussed in the following section, this report summarizes the results of our efforts.

#### OBJECTIVES, SCOPE, AND METHODOLOGY

The objective of this report is to provide the Congress and others with information on major aspects of the SPR program. Specifically, this report addresses whether the Department of Energy (DOE) could

- improve SPR oil acquisition methods (ch. 3);
- effectively and efficiently withdraw, distribute, and sell the stored oil in the event of an oil disruption (ch. 4); and
- improve the SPR's day-to-day operations and management (ch. 5).

In addition, this report addresses optional developmental strategies for the SPR (ch. 6).

To address our objective, we primarily relied on information in nine GAO reports and GAO congressional testimony that specifically address the above topics and also on related information included in several of our quarterly status reports<sup>1</sup> on SPR activities. Appendix I lists our reports and testimony on which this report is based. The specific objectives, scope, and methodology for the individual reports are contained in those respective reports. Information was updated where appropriate to

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<sup>1</sup>In March 1982, the Senate Committee on Energy and Natural Resources requested that we provide quarterly status reports through fiscal year 1985 on DOE's progress in filling the SPR and in complying with requirements of applicable law.

reflect DOE positions and actions taken on our reports. We also conducted additional audit work to supplement our reports where necessary, as discussed below.

To update our oil acquisition work, we obtained information from DOE and Defense Fuel Supply Center (DFSC)<sup>2</sup> records and documents on oil acquisition and transportation prices to determine the reasonableness of SPR 1984 oil acquisition costs.

In addition to our issued reports on SPR operations and management of activities, we also obtained and analyzed information from officials at DOE's Project Management Office (Project Office) in New Orleans, Louisiana, and DOE's Operations Office in Oak Ridge, Tennessee, on DOE's plans for using a management, operation, and maintenance contractor at the SPR and how this type of contract would improve project management. Because this contract was not in effect during our reviews--it became effective on April 1, 1985--our work was limited to obtaining the views of the Manager, Oak Ridge Operations Office, as well as other Operations Office and Project Office officials, and reviewing various contract-related documents and DOE's plans to implement various management controls for monitoring this contract. Our primary work relating to withdrawing oil from the SPR was recently completed and therefore did not need to be updated.

In addition, we reviewed the Baseline Assessment of the Strategic Petroleum Reserve Project Management Office issued by the Oak Ridge Operations Office in October 1983. The Operations Office made this assessment to determine the SPR's status and condition shortly after assuming project management and implementation responsibilities in June 1983. Its report discussed the condition of the SPR project, identified problems, and made recommendations for improving operations.

Our work was conducted in accordance with generally accepted government auditing standards, except that:

--As stated in our quarterly status reports on SPR activities, we did not verify the volumes or quality of oil that DOE received nor the available capacity of SPR storage facilities.

--As stated in our report entitled More Assurance Is Needed That Strategic Petroleum Reserve Oil Can Be Withdrawn as Designed (GAO/RCED-85-104, Sept. 27, 1985), data relating to DOE's projections of SPR drawdown capability were generated by a computerized mathematical model. We did not attempt to validate the model or assess the reliability of the related computer programs.

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<sup>2</sup>DFSC is the purchasing agent for most SPR oil.

The work forming the basis for this report was performed primarily from June 1982 through December 1984. Selected updating and audit work was performed through August 1985.

## CHAPTER 2

### HISTORICAL PERSPECTIVE

#### AND STATUS OF THE SPR

During the winter of 1973-74, an oil embargo by Middle Eastern nations interrupted U.S. oil imports. The resulting petroleum shortage, and simultaneous oil price increase, caused severe economic impacts on the U.S. economy, estimated as a loss of \$35 to \$45 billion in gross national product and 500,000 jobs. The interruption also demonstrated the nation's vulnerability to the effects of future oil import disruptions.

In response to the oil supply interruption, the Congress passed the Energy Policy and Conservation Act (Public Law 94-163, Dec. 22, 1975). The act authorized the creation of the SPR to store up to 1 billion barrels of crude oil and/or petroleum products. If future U.S. oil supplies were disrupted, SPR oil could supplement the U.S. industry's stocks and supplies, thereby helping to mitigate the disruption's effects on the national economy and reduce its vulnerability to such disruptions. Further, the SPR could help the United States meet its commitment, as a member of the International Energy Agency, to maintain a reserve equal to 90 days of the previous year's net oil imports. The Energy Policy and Conservation Amendments Act of 1985 (Public Law 99-58, July 2, 1985) extended the authority for the SPR until June 30, 1989, and for U.S. participation in the International Energy Agency until June 30, 1988.

As required by the Energy Policy and Conservation Act, in February 1977 the Federal Energy Administration (FEA)<sup>1</sup> transmitted to the Congress a plan to acquire oil and develop storage facilities for the SPR. The initial plan provided for a requirement that the reserve should be large enough to offset the highest amount of oil imported during a consecutive 3-month period in 1974-75. The plan envisioned that a reserve of this size, with a daily drawdown rate of 3.3 million barrels, would replace about 45 percent of the then-projected 1985 import rate of 7.5 million barrels of oil per day.<sup>2</sup> The plan provided that the SPR would store crude oil, but no refined products, and determined that the preferred location for the SPR was in underground caverns or mines in Louisiana and Texas. Subsequently, in May 1978, the SPR plan was amended. On the basis of an increase in U.S. petroleum imports during 1977 and revised estimates of future import levels,

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<sup>1</sup>FEA initially was responsible for the SPR program.

Responsibility was transferred to the Department of Energy when it was established in October 1977.

<sup>2</sup>The Energy Information Agency estimates net oil imports for 1985 at 4.6 million barrels per day; therefore, a drawdown of 3.3 million barrels per day now would replace about 72 percent of net imports.

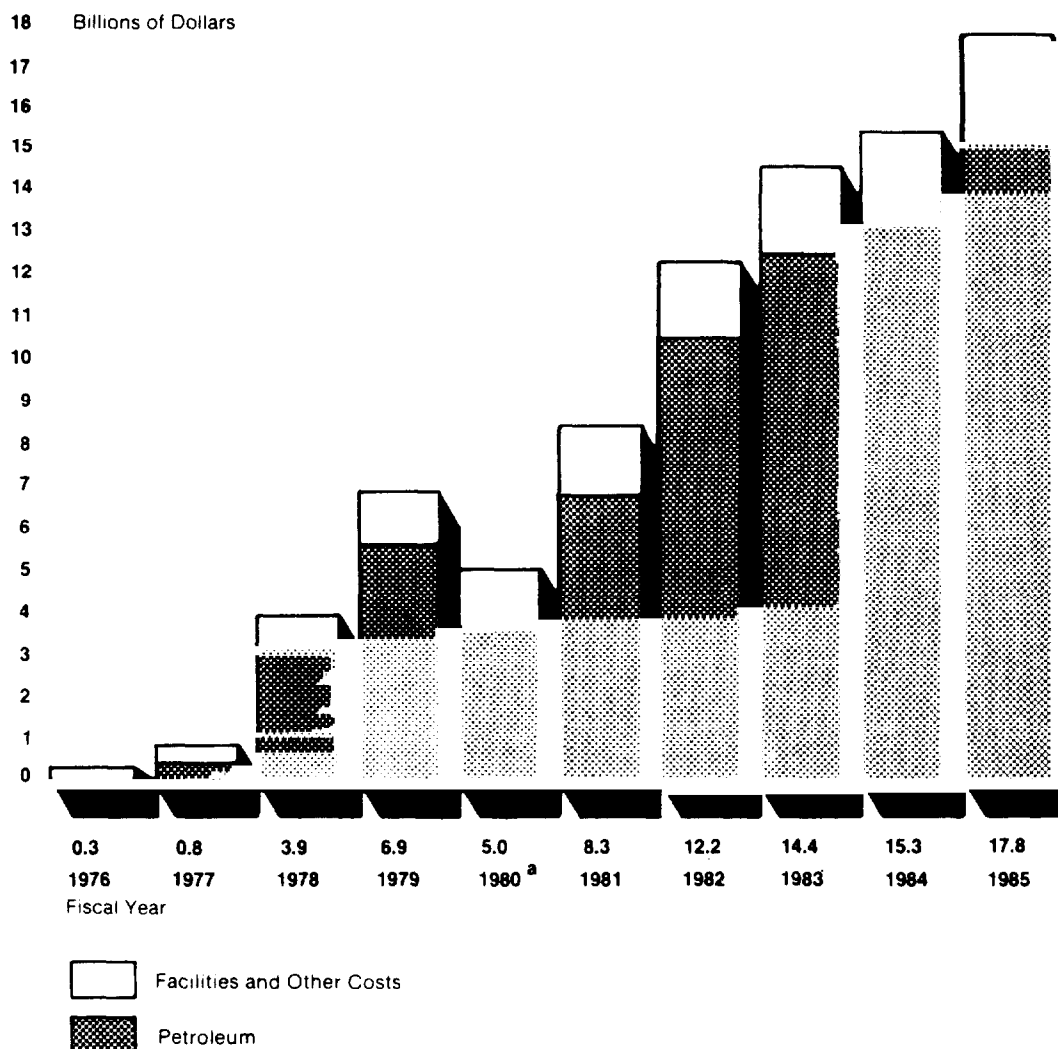


the amendment increased the SPR's ultimate size to 1 billion barrels and expanded the implementation plan to provide for 750 million barrels. However, no plans were made then, and none have been made since, to develop the final 250 million barrels.

Through fiscal year 1985, the Congress has appropriated about \$17.8 billion to develop and fill the SPR--about \$2.7 billion for facilities development, operations, maintenance, and management and about \$15.1 billion for oil acquisition and transportation (see fig. 2.1). DOE estimated that the total cost to complete a 750-million-barrel SPR program as initially planned would be about \$25.7 billion--about \$3.7 billion for facilities development and related costs and about \$22 billion for oil acquisition and transportation.

Figure 2.1

SPR Cumulative Funding, Fiscal Years 1976-85



<sup>a</sup> Reflects a \$2 billion recession.

Budget deficit considerations have now made the plans for completing the SPR uncertain. The administration's fiscal year 1986 budget proposed an indefinite moratorium on further SPR development, including stopping oil fill at the end of fiscal year 1985. At that time, the SPR will contain about 489 million barrels of crude oil. The proposed budget justification states that since 1979 net U.S. oil imports, excluding the SPR, have fallen by over 40 percent and U.S. oil imports from Arab Organization of Petroleum Exporting Countries (OPEC) have decreased by over 70 percent. By the end of 1985, the budget justification states that the SPR will contain the equivalent of over 108 days of estimated net U.S. oil imports and the equivalent of over 500 days of 1984 U.S. oil imports from Arab OPEC nations. As stated in the budget justification, this amount is equal to or better than the level of protection envisioned when the current plan for the 750-million-barrel SPR was established.

The budget justification states that the moratorium would reduce outlays by \$8 billion between 1986 and 1990 if continued for 5 years. The SPR would be maintained in a state of standby readiness, and the moratorium would be reassessed, when warranted, as fiscal and oil market conditions change. No new funding would be required in fiscal year 1986, according to the budget justification, because unobligated funds appropriated in prior years would be sufficient to effect the transition to a standby readiness condition.

In the fiscal year 1986 budget justification, DOE notified the Congress that it was proposing to defer expenditures of about \$1.1 billion of prior year appropriations that would have been used to continue the development of additional storage capacity and acquire additional oil. Because of the proposed moratorium, the completion date of a 750-million-barrel reserve would be delayed beyond 1990.

The Congress, however, did not accept the administration's proposed moratorium. The Supplemental Appropriations Act of 1985 (Public Law 99-88, Aug. 15, 1985) disapproved the proposed deferral of funds for construction of additional storage capacity and a portion of the proposed deferral of funds for oil acquisition. The latter funds are to be used to fill the SPR in fiscal year 1986 up to a total of 500 million barrels.

#### SPR FACILITIES

Since October 1977, DOE has been responsible for managing the development, fill, and operation of the SPR. To implement the SPR plan's goal of 750 million barrels, DOE established a three-phase program to develop and fill six storage sites on the U.S. Gulf Coast. (See table 2.1)

Table 2.1

SPR Storage Capacity

<u>Storage sites</u>	<u>Phase I</u>	<u>Phase II</u>	<u>Phase III</u>	<u>Total</u>
	------(millions of barrels)-----			
Bayou Choctaw, LA	47	10	10	67
Weeks Island, LA	73	-	-	73
West Hackberry, LA	49	160	10	219
Sulphur Mines, LA	26	-	-	26
Bryan Mound, TX	65	120	40	225
Big Hill, TX	-	-	<u>140</u>	<u>140</u>
 Total	 <u>260</u>	 <u>290</u>	 <u>200</u>	 <u>750</u>

Phase I of this plan, the storage of about 260 million barrels of oil, is complete. It consisted of acquiring and modifying for oil storage existing caverns in salt deposits at Bryan Mound, Texas; Bayou Choctaw, Sulphur Mines, and West Hackberry, Louisiana, and a salt mine at Weeks Island, Louisiana, as well as constructing a marine terminal at St. James, Louisiana. Phase II, which began in 1979 and was scheduled for completion in 1987, involves creating new caverns at three of the Phase I sites to increase SPR capacity to about 550 million barrels. Phase III, which began in 1982 and was scheduled for completion in 1990, involves creating additional capacity to reach the 750-million-barrel goal by adding additional caverns to three existing storage sites and developing a new site at Big Hill, Texas. The SPR oil inventory is expected to be stored in the following manner at the end of fiscal year 1985:

Table 2.2

Planned SPR Oil Storage  
as of September 30, 1985

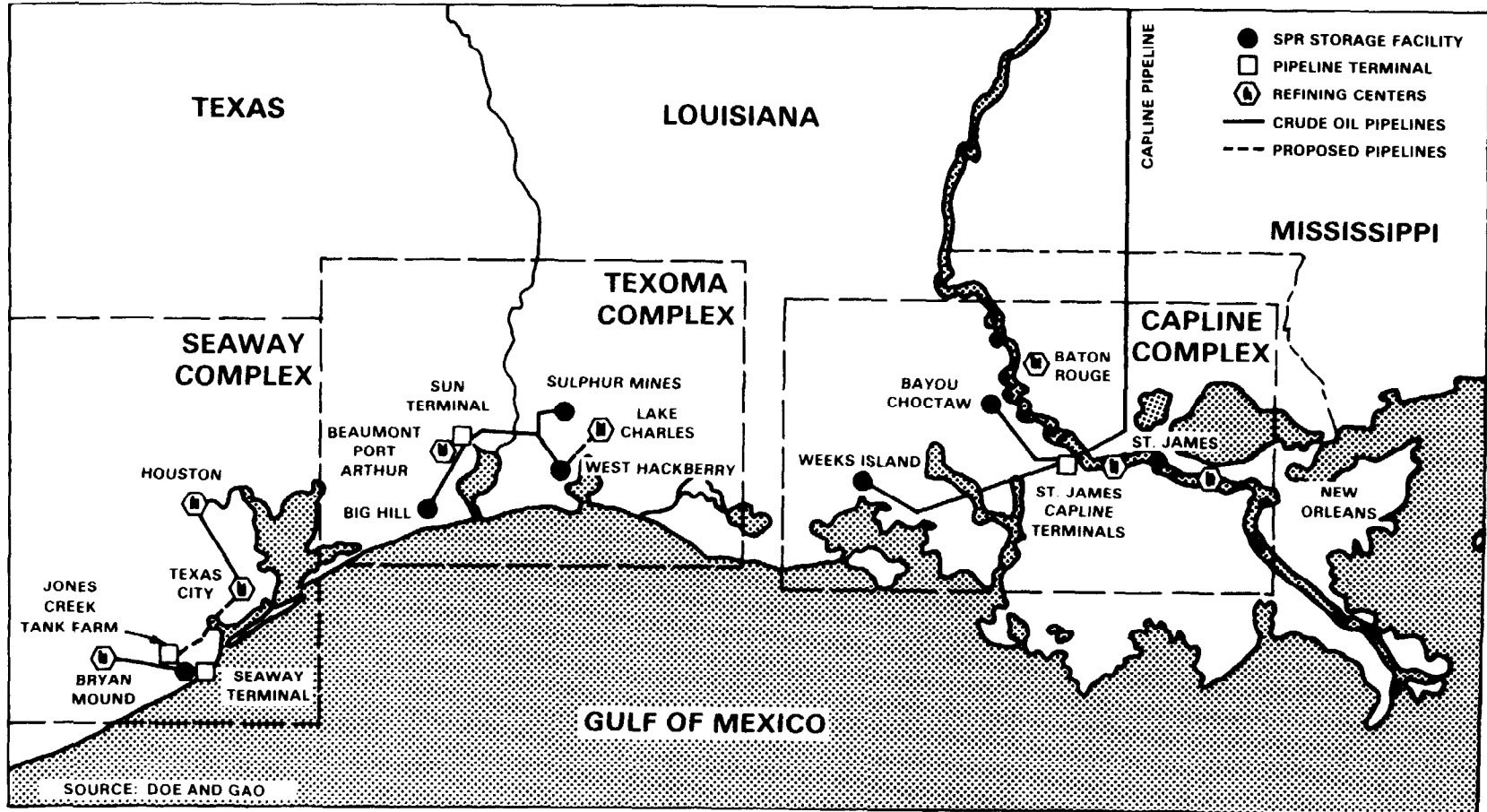
<u>Storage facility</u>	<u>No. of barrels (millions)</u>
Bayou Choctaw	46.0
Weeks Island	73.0
West Hackberry	156.2
Sulphur Mines	26.1
Bryan Mound	185.6
Tanks and Pipelines	<u>2.2</u>
 Total	 <u>489.1</u>

Each SPR storage site is connected by pipeline to one of three marine terminals used for oil fill and oil distribution during an oil supply disruption (see fig. 2.2):

- Seaway complex: The Bryan Mound storage site is connected to Phillips Petroleum Company's terminal in Freeport, Texas.
- Texoma complex: The West Hackberry and Sulphur Mines storage sites are connected to Sun Oil Co.'s terminal in Nederland, Texas. Under the SPR plan, the Big Hill storage site was also to be connected to this terminal.
- Capline complex: The Weeks Island and Bayou Choctaw storage sites are connected to DOE's St. James terminal. In addition, the Capline complex is connected to the Capline interstate pipeline that can be used to distribute oil to Midwest refineries.

Figure 2.2

The Strategic Petroleum Reserve System



DOE owns and operates the marine terminal at St. James, Louisiana, and has multi-year contracts to use two commercial terminals at Freeport and Nederland, Texas. These terminals and the sites connected to them are referred to, respectively, as the Seaway, Texoma, and Capline distribution groups because at the time of selection they were connected to those interstate pipelines that carried crude oil from the Gulf Coast to the Midwest. In 1984, both Seaway Pipeline, Inc., and Texoma Pipeline Company sold their pipelines due to the reduction in crude oil demand by Midwestern refiners. The new owners are converting the pipelines for natural gas transmission. To compensate for the converted pipelines, DOE has planned some enhancements to improve its future distribution capabilities. These proposed improvements are discussed more in chapter 4.

#### SPR OIL FILL RATE

The SPR oil fill rate, guided by legislation and funding limits, has varied since the inception of the program. Table 2.3 shows the oil fill rate for each fiscal year since 1977 and the total inventory at the end of each year.

Table 2.3

#### SPR Oil Inventory and Fill Rates

<u>Fiscal year</u>	<u>Oil delivered during fiscal year</u>	<u>Average daily fill rate for fiscal year</u>	<u>Total SPR inventory</u>
	(millions of barrels)	(barrels)	(millions of barrels)
1977	1.1	3,000	1.1
1978	48.0	131,000	49.1
1979	42.1	115,000	91.2
1980	1.6	4,000	92.8
1981	106.5	292,000	199.3
1982	78.6	215,000	277.9
1983	83.1	228,000	361.0
1984	70.1	191,000	431.1
1985 (est.)	58.0	159,000	489.1

Source: DOE.

The Energy Policy and Conservation Act required that at least 150 million barrels be stored in the SPR by the end of 1978 and approximately 500 million barrels by 1982. In its SPR plan issued in February 1977, the Federal Energy Administration set forth its plans for achieving those goals. However, the goals proved to be overly optimistic as the program experienced a number of problems during its first 5 years. Construction progressed at a slower rate than anticipated because of technical problems, delays in preparing caverns for oil fill, delays in land acquisition, and problems in obtaining environmental permits. In addition, DOE

stopped buying crude oil for the SPR between April 1979 and August 1980 due to a world-wide oil shortage. Consequently, the SPR contained only 69 million barrels of oil by the end of 1978 and 294 million barrels by the end of 1982.

In June 1980, in part to encourage the government to resume oil purchases and continue filling the SPR, the Congress enacted the Energy Security Act (Public Law 96-294). Title VIII of the act requires DOE to fill the SPR at an average rate of at least 100,000 barrels per day for fiscal year 1982 and each succeeding fiscal year until it equals or exceeds the amount set forth in the SPR plan. To ensure this rate of fill, it also stated that no portion of the government's share of oil from Elk Hills Naval Petroleum Reserve (NPR)--the second largest producing oil field in the United States--may be sold or disposed of, other than to the SPR, during any fiscal year unless the average 100,000-barrel-per-day fill rate is achieved, or until the SPR contains 500 million barrels.<sup>3</sup>

In December 1980, the Congress enacted the Department of the Interior and Related Agencies Appropriations Act for Fiscal Year 1981 (Public Law 96-514) which directed the President to seek to fill the SPR at an average rate of 300,000 barrels per day. During fiscal year 1981, DOE filled the SPR at a rate of 292,000 barrels per day. During fiscal year 1982, DOE filled the SPR at a somewhat lower rate of 215,000 barrels per day.

In August 1982, the Congress enacted the Energy Emergency Preparedness Act of 1982 (Public Law 97-229) requiring a minimum average annual SPR fill rate of 300,000 barrels per day beginning July 1, 1982. This requirement, which is subject to the availability of funds, continues until at least 500 million barrels of oil are stored. The act allows a lower fill rate in the event the President finds that the 300,000-barrel-per-day rate during a particular fiscal year would not be in the national interest. If the President makes such a finding, the minimum fill rate during the fiscal year would be 220,000 barrels per day, or the highest practicable fill rate achievable with available funds. After the SPR reaches 500 million barrels, the act requires the President to seek to fill the SPR at an average annual rate of at least 300,000 barrels per day until the SPR reaches 750 million barrels.

In December 1982, the administration submitted to the Congress a finding that it was not in the national interest to fill the SPR at the 300,000-barrel-per-day rate during fiscal year 1983. During that fiscal year, DOE filled the SPR at 228,000 barrels per day, which filled the available SPR storage capacity at that time.

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<sup>3</sup>As discussed in chapter 6, this provision was amended on August 15, 1985, allowing NPR oil to be sold in fiscal year 1986 and thereafter if the SPR oil fill rate is sufficient to attain a level of 500 million barrels by the end of the fiscal year regardless of the daily fill rate.

For fiscal year 1984, the Interior and Related Agencies Appropriations Act of 1984 (Public Law 98-146, Nov. 4, 1983) established a minimum oil fill rate of 186,000 barrels per day. DOE filled the SPR at an average 191,000 barrels per day in fiscal year 1984. As of September 30, 1984, the SPR contained about 431 million barrels of oil, which again filled the SPR storage capacity at that time.

DOE, in its fiscal year 1985 budget request, stated its plans to fill the SPR at a rate of 145,000 barrels per day in fiscal year 1985 and thereafter, thus bringing the cumulative inventory to over 500 million barrels by the end of fiscal year 1986 and to 750 million barrels by the end of fiscal year 1991.

The Congress did not pass the Interior and Related Agencies Appropriations Bill for fiscal year 1985 before it adjourned on October 12, 1984. As a result, SPR oil acquisition and transportation funds were provided by the Continuing Resolution for fiscal year 1985 (Public Law 98-473), which appropriated \$2.05 billion in order to achieve a fill rate of 159,000 barrels per day in fiscal year 1985. If the SPR is filled at this rate, it will contain 489 billion barrels of oil at the end of the fiscal year. During the first 9 months of the fiscal year, DOE filled the SPR at an average rate of 166,700 barrels per day, bringing the total inventory as of June 30, 1985, to 476.6 million barrels. Legislation establishing a fill rate for fiscal year 1986 was under consideration by the Congress but had not been enacted as of August 31, 1985.

#### RESPONSIBILITIES FOR THE SPR

FEA was responsible for the SPR's initial planning and development. When DOE was created on October 1, 1977, it assumed responsibility for the SPR. Within DOE, responsibility for the project's continued development was assigned to the SPR Program Office in Washington, D.C. In early 1978, DOE established a Project Management Office in New Orleans to improve overall SPR management activities. Responsibility was divided between the Program and Project Offices. The Deputy Assistant Secretary for the SPR headed the Program Office and had oversight of program management, planning, and budgeting activities. The Project Office was responsible for day-to-day activities and reported to the Deputy Assistant Secretary. The Project Office's responsibilities included developing and filling the storage facilities, operating and maintaining the sites, testing drawdown capabilities, contracting and contract management, and preparing the sites for standby status after oil fill activities were completed.

DOE reorganized the SPR project management structure in June 1983 to improve SPR management and to make it similar to the management structure of other major DOE projects. Responsibility for project management and implementation was assigned to the Oak Ridge Operations Office in Oak Ridge, Tennessee. The Manager of



the Operations Office directs SPR activities through the SPR Assistant Manager within the Operations Office. The Project Office is responsible for carrying out day-to-day project implementation activities as delegated by the Manager of the Operations Office.

The Defense Fuel Supply Center, as a result of a 1977 interagency agreement between FEA and the Department of Defense (DOD), is the purchasing agent for most SPR crude oil. DOE issued to DFSC periodic oil acquisition orders that specified quantities, types, and physical properties of crude oil to be purchased for the SPR and schedules for delivering the oil to SPR marine terminals.

### CHAPTER 3

#### SPR OIL ACQUISITION METHODS AND PROCEDURES HAVE BEEN REASONABLE

DOE has primarily acquired oil for the SPR through DFSC purchases on the crude oil spot, or short-term, market<sup>1</sup> and through DOE's direct long-term contracts with Petroleos Mexicanos (PEMEX), the Mexican national oil company. Our reviews of the acquisition methods and internal DFSC procedures for purchasing SPR oil found that (1) the two major methods of acquiring SPR oil have been economical and advantageous, and DFSC's procedures for purchasing SPR oil generally have assured that purchase prices were fair and reasonable and resulted in the lowest overall cost to the government, and (2) DOE and DFSC prices for SPR oil compared favorably with prices that commercial oil companies paid.

The use of U.S.-flag tankers to transport oil to the SPR in compliance with the requirements of the Cargo Preference Act of 1954 (46 U.S.C. 1241(b)) has increased oil acquisition costs. In addition, several Inspector General reports have noted oil accountability control problems. DOE has, however, taken steps to improve its controls.

#### DOE's OIL ACQUISITION METHODS HAVE BEEN REASONABLE

DOE has assessed and used a number of mechanisms for acquiring SPR oil. These alternatives have included DFSC oil purchases from private oil companies and traders on the crude oil spot market or by long-term contracts; direct long-term contracts with the national oil company of an oil-producing country; and the direct acquisition of or an exchange program involving federal NPR oil. These methods have generally benefited the U.S. government. DOE has also considered for the SPR but has not used federal royalty oil--oil the federal government receives as a royalty payment for oil or natural gas produced on leased offshore and onshore federal lands.

#### Use of spot market has been beneficial

In January 1981, DOE authorized DFSC to buy oil regularly on the crude oil spot market. From January 1981 through June 1985, DFSC acquired 209 million barrels of oil through spot purchases. This acquisition method has been beneficial in terms of cost.

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<sup>1</sup>The spot market is an informal, world-wide network of oil companies, traders, and brokers who buy and sell oil in an open and unregulated market. The market's trading activity and prices are related to supply and demand conditions of the total world oil market.

Generally, when supplies are abundant, as they have been since 1981, spot trading flourishes and prices tend to fall below the producers' official selling prices. The reverse normally will occur in short supply conditions. Spot market prices are more volatile than long-term contract prices, which normally are pegged to oil producers' official selling prices. When world crude oil prices fell substantially between January 1981 and June 1985, DFSC was able to take advantage of the decline in spot market prices. For example, the official selling price of Brent, a British North Sea sweet (low sulphur content) crude oil, dropped from \$39.25 per barrel in January 1981 to \$28.65 per barrel in December 1984. DFSC paid \$27.95 for Brent on the crude oil spot market in November 1984.

In 1981 and 1982, DOE and DFSC bought two-thirds of the oil for the SPR through the spot market and one-third through long-term contracts. In contrast, about 90 to 95 percent of total oil imports into the United States during that period were acquired through long-term contracts. We reported on this acquisition strategy in our September 1983 report entitled Comparison of Strategic Petroleum Reserve Oil Prices and Commercial Oil Prices (GAO/RCED-83-156). In our report, we compared DFSC's spot market prices with the average long-term contract prices that oil companies paid for the same crude oil type that was loaded on tankers in the same month and year. The comparison showed that DOE and DFSC reduced the SPR oil acquisition cost by buying oil on the spot market--for 96.6 million barrels of oil bought on the spot market in 1981 and 1982, DFSC paid 66 cents per barrel (\$63.9 million) less than average long-term contract prices.

PEMEX long-term contract purchases have been advantageous

From January 1981 through June 1985, DOE acquired about 124 million barrels of sour (high sulphur content) crude oil through long-term PEMEX contracts. The PEMEX contracts have provided an assured oil supply over a long period of time and generally have been advantageous to DOE, as compared with spot market purchases, when transportation costs are considered.

The primary sources of SPR sour crude oil are Mexico and Middle Eastern countries, such as Saudi Arabia and Dubai. Our September 1983 report on SPR oil prices found that Mexican purchases have reduced overall sour oil acquisition costs by reducing the distance that tankers travel. For example, Isthmus crude from Mexico and Arab Light crude from Saudi Arabia are of comparable quality. While the cost of PEMEX Isthmus crude was not always less than Arab Light crude sold on the spot market, we found that the difference in transportation costs from Mexico and the Arabian Gulf generally made Mexican oil less expensive for

most of 1982. During 1982, U.S.-flag tanker rates<sup>2</sup> were about 90 cents per barrel from Mexico and \$5 per barrel from the Arabian Gulf to SPR marine terminals, while foreign-flag tanker rates were about 50 cents per barrel from Mexico and \$1.50 per barrel from the Arabian Gulf. While crude oil prices and tanker freight rates have fallen since 1982, we found that during 1984 the price of a typical barrel of Isthmus crude delivered to the SPR, depending on the fluctuations of Arab Light spot prices, was less expensive than a typical barrel of Arab Light delivered to the SPR during almost all of the year.

We reported in our April 1984 report entitled Status of Strategic Petroleum Reserve Activities as of March 31, 1984 (GAO/RCED-84-148) that DOE has had contacts with other foreign national oil companies concerning SPR oil purchases. DOE has not negotiated with these companies mainly because of differences about the quality or the price of available oil.

#### Other alternative oil acquisition methods

DOE Program Office personnel periodically have assessed and, in some cases, used alternative SPR oil acquisition methods. In particular, they have assessed and used Elk Hills NPR crude oil, and assessed but not used federal royalty oil to fill the SPR.

In our March 31, 1984, SPR activities status report, we noted that DOE does not plan to use either NPR or federal royalty oil to fill the SPR in the near future. DOE made this decision because of the current availability of lower cost crude oil on the spot and long-term markets and because transporting the West Coast NPR oil or federal royalty oil directly to the SPR, or exchanging either oil for other crude oil for the SPR, poses logistical difficulties and an administrative burden.

#### NPR oil

The Elk Hills NPR, located near Bakersfield, California, is jointly owned by the U.S. government and Chevron U.S.A., Inc. The NPR is the second largest producing oil field in the United States. It produced 138,000 barrels of oil per day in fiscal year 1984, and DOE expects production to average 132,000 barrels per day in fiscal year 1985.<sup>3</sup> In fiscal year 1984, the government's share of Elk Hills NPR production averaged 108,000 barrels per day (78 percent).

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<sup>2</sup>The SPR program, as a federal procurement program using ocean-going vessels, is required by the Cargo Preference Act to transport at least 50 percent of the oil in commercial U.S.-flag tankers to the extent that such vessels are available at fair and reasonable rates.

<sup>3</sup>About 83 percent of NPR production marginally meets the SPR oil quality specifications for sweet crude oil.

DOE used Elk Hills NPR oil to acquire about 37.9 million barrels of oil for the SPR between fiscal years 1981 and 1983. Most of this oil was acquired by offering the government's share of NPR production in a competitive sale in exchange for an equal amount of oil to be delivered to the SPR. DOE has not acquired any additional Elk Hills NPR oil for the SPR.

DOE has considered using NPR oil to fill the SPR several times. In a memorandum dated July 2, 1981, DOE's Acting Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness advised the Secretary of Energy that he planned to acquire SPR oil for fiscal year 1982 from open crude oil market procurements and use NPR oil only during tight oil market conditions because this strategy would result in the widest range of industry competition for both SPR purchases and NPR sales. The SPR Program Office also analyzed the cost effectiveness of acquiring NPR oil before DOE offered it for competitive sale in July 1983 and December 1983. The analyses found that acquiring NPR oil had no perceived cost advantage.

In related audit work performed in February 1984, we compared the costs of NPR oil transported overland to the SPR by pipeline (the most cost-effective method) with the cost of British North Sea crude oils (slightly better quality crude oils than NPR crude oil) transported to the SPR by tanker. Our analysis showed that the cost of NPR oil and transportation was generally comparable to DFSC spot market purchase prices for North Sea oils plus transportation between October 1983 and December 1983. As such, NPR oil did not offer any cost advantage and its use could disrupt small refineries dependent on NPR oil.

As a follow-up to this work, we conducted a cost analysis of NPR oil and British North Sea sweet crude oils using data from November and December 1984. Our analysis disclosed that the average price per barrel for NPR oil during this period, plus overland pipeline transportation costs, generally exceeded the spot market purchase prices of British North Sea oils, plus the cost of transporting it by tanker to the SPR.

#### Federal royalty oil

The Department of the Interior (DOI) is responsible for leasing offshore and onshore federal lands for oil and natural gas exploration and production. Under these leases, if the land produces oil or natural gas, the federal government is entitled to royalty payments on the oil or gas produced. The Mineral Leasing Act of 1920, as amended (30 U.S.C. 223), and the Outer Continental Shelf (OCS) Lands Act (43 U.S.C. 1337) set a statutory royalty minimum of 12.5 percent of production, although the actual amount can be higher.

The Secretary of the Interior can elect to take the government's royalty share in currency or "in kind," that is, in crude oil and/or natural gas. Since 1946, the federal government

has offered to sell its royalty-in-kind share to refiners that do not have access to adequate supplies of oil at equitable prices. The royalty-in-kind program provides a steady, secure source of offshore and onshore domestic crude oil to these refiners.

In October 1980, the SPR Program Office considered acquiring the government's share of OCS royalty oil for the SPR but recommended that this option be deferred until after the expiration of domestic oil price controls. DOE determined that using royalty oil for the SPR would adversely affect small refiners, lessees, and major refiners by disrupting secure, long-standing oil supply relationships and by forcing them to obtain crude oil at higher spot market prices. The SPR Program Office has not formally evaluated using OCS royalty oil for the SPR since the President decontrolled domestic oil prices in January 1981.

Based on 1983 production estimates and royalty sales, DOI received over 144,000 barrels per day of high quality sweet crude as royalties from OCS production in the Gulf of Mexico. About 59,000 barrels per day were sold to small refiners, leaving about 85,000 barrels per day available for SPR purchases.

According to DOE, using OCS royalty oil would entail logistical difficulties and an administrative burden. OCS oil is currently transported through a network of offshore pipelines to as many as 40 onshore terminals. Small refiners participating in the royalty oil sales program rely on oil that can be delivered to major coastal terminals with onshore pipeline connections. The royalty oil that would be available to DOE mainly is dispersed among less accessible terminals that do not have onshore pipeline connections that can move the oil directly to SPR facilities. Because the logistical constraints involved in moving the oil to the SPR from many terminals tend to increase the SPR's oil acquisition cost, royalty oil is therefore economically less attractive than oil that is readily available on the spot market.

In related audit work performed in February 1984, we compared the cost of buying and transporting OCS royalty oil to the SPR with the cost of buying and transporting British North Sea sweet crude from October through December 1983. Our analysis showed that it would have cost more per barrel to deliver OCS royalty oil to the SPR than British North Sea sweet crude purchased on the spot market.

DFSC'S PURCHASE PROCEDURES GENERALLY  
ASSURED FAIR AND REASONABLE PRICES  
AT LOWEST OVERALL COST

DOD's acquisition regulations establish criteria for DFSC's procedures for buying SPR oil. In particular, the regulations require that negotiated contract prices be fair and reasonable and calculated to result in the lowest overall cost to the government. Because of the nature of the oil acquisition program, the

regulations require that DFSC use competitive procedures and a price or cost analysis to determine whether offers are fair and reasonable. Our September 1984 report entitled Defense Fuel Supply Center Procedures for Purchasing Strategic Petroleum Reserve Oil (GAO/RCED-84-61) concluded that DFSC's purchasing procedures generally assured that its spot market purchase prices were fair and reasonable and resulted in the lowest overall cost to the government.

#### DFSC followed its policies and procedures

DFSC has used an open, continuous solicitation to request spot market offers. It developed a 2-week cycle to solicit offers, conduct a market price analysis, negotiate with offerors, ask for best and final offers, and award contracts. DFSC has used its price analysis to determine whether offers are fair and reasonable. To accomplish its price analysis, DFSC regularly has used oil producers' official selling prices, trade journal reports of spot market transactions, and/or prices obtained by its market price analyst through spot market contacts. Since spot market transactions are not required to be made public, market traders, brokers, and trade journalists also rely on trusted spot market contacts for price and other information. If current spot market price information on certain infrequently traded types of crude oil was not available, DFSC estimated a fair price based on past market price relationships between the crude oil and another that was regularly traded on the spot market.

DFSC used its market price analysis to establish a range of fair spot market prices for the various crude oil types. From February 1981 to May 1983, its policy was to pay no more than the high of the spot market price range or the producer's official selling price, whichever was lower, for a crude oil type. Because of the reduction in world oil demand and the shift of buyers to the crude oil spot market, DFSC's policy since June 1983 has been to pay no more than the spot market high price for a given type of crude oil. DFSC then awarded contracts for the offers within its price ranges that minimized the government's total acquisition cost.

We examined DFSC pre-award files for all 42 spot market solicitation closings between February 1981 and May 1983 to determine whether DFSC had adhered to its pricing policies and procedures. For each closing, DFSC performed a price analysis that used the price sources described in its procedures. In fiscal year 1982, DFSC awarded 41 spot market oil contracts. Prices for 37 contracts fell within DFSC's spot market price range. Prices for the other four contracts exceeded the spot

market high price.<sup>4</sup> However, DOD's acquisition regulations recognize that it is not always possible to meet the government's pricing objectives and therefore require the contracting officer to exercise judgment in making a final award decision. In examining each of these four cases, we found no basis for questioning the contracting officer's determination that prices were fair and reasonable under the circumstances and that the purchase was in the government's best interest.

We also evaluated the overall price results of DFSC's purchases by comparing each of DFSC's fiscal year 1982 spot market purchases with the DFSC spot market price range for the purchases. For 34.7 million barrels of oil, DFSC paid an average of 14 cents per barrel less than the oil's market high price and 19 cents per barrel more than its market low price. Spot market traders and observers we interviewed generally gave DFSC good marks for the prices it paid. Several stated that DFSC has obtained excellent prices, especially considering that it must comply with government procurement requirements while private spot market traders are not similarly constrained.

Making an exception to price criteria in certain circumstances could reduce costs

DFSC's policy is to pay no more than the high of its spot market price range for any particular crude oil type. A lower priced oil at 1 cent per barrel above its market high price would, therefore, be rejected to purchase a higher priced oil at or below its market high price, even though both are acceptable oils for filling the SPR. We reported that in three cases between October 1981 and May 1983, DFSC could have bought a lower priced oil of equal acceptability if it had slightly exceeded its spot market price range by 15 cents per barrel or less. If DFSC had made such an exception in the three cases, oil acquisition costs could have been reduced by about \$1.9 million. Although DFSC on occasion has awarded contracts for oil that exceeded the spot market price range, it has not developed formal guidelines that identify acceptable considerations for making an exception to the market high price criteria. DFSC's unwritten policy is that exceptions are decided on a case-by-case basis.

Our report pointed out that determining a reasonable price for crude oil is imprecise, at best, because spot market price data are confidential and therefore not easily accessible. Spot market traders and observers informed us that the closest a fair price could be pinpointed at any given time would be plus or minus 5 to 15 cents in steady markets for commonly traded crude oil types.

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<sup>4</sup>DFSC determined that substantial third-party transactions were being made at the official selling prices and therefore adjusted the original market price ranges in light of this information. These prices, however, were less than or equal to the producer country's official selling price.



Our report recommended that DFSC develop formal guidelines for making an exception to its spot market high price criteria when relatively small adjustments would result in lower per barrel acquisition costs. This policy would be consistent with DOE and DOD objectives to minimize overall oil acquisition costs.

DOD and DOE disagreed with our recommendation. Both questioned whether purchasing lower cost, lower quality oil at above-spot-market-range prices would in reality represent a cost savings over paying a reasonable price for a higher quality crude oil. DOD stated that paying an unreasonable price for lower quality oil does not represent a savings and therefore the savings projected by GAO are illusory. DOE also stated that the government's total cost--reflecting both the acquisition cost and the sales revenue--must be considered. In addition, DOD stated that DFSC is required to ensure that its purchases minimize its impact on market prices.

Our report stated that we believed our recommendation was still valid. Paying a price slightly higher than DFSC's spot market price range is not unreasonable when (1) the oil meets the SPR's quality standard, (2) the price results in a lower per barrel acquisition cost, and (3) the price is lower than long-term contract prices. Lower acquisition costs can also result in savings because they are immediate, while the added value of higher quality crude oil would not be realized until the oil is sold during a supply disruption. In present value terms, a dollar now is worth more than a dollar received in the future.

We stated that compliance with our recommendation would not, in our opinion, unduly influence market prices. The occasions that would give rise to paying slightly more than DFSC's spot market price range are relatively infrequent. Our review disclosed only three instances over a 20-month period. Also, the spot market price ranges are imprecise. Consequently, if DFSC exceeded by small amounts the high of the spot market price range derived through its market analysis, the market likely would perceive the price transacted as fair and reasonable. In addition, our recommendation provides flexibility by calling for DFSC to consider, but not necessarily purchase, crude oil that slightly exceeds its spot market price range. One consideration would be the impact of the purchase on the crude oil spot market.

#### SPR OIL PRICES COMPARED WITH OIL COMPANY PRICES

Prior to reviewing DFSC's purchase procedures, we had compared in our September 1983 report, Comparison of Strategic Petroleum Reserve Oil Prices and Commercial Oil Prices (GAO/RCED-83-156), DOE and DFSC purchases of 150 million barrels of SPR oil during 1981 and 1982 with comparable oil companies' purchases of oil from the same crude oil streams in the same

time frame.<sup>5</sup> Our comparison showed that DOE and DFSC paid from 6 cents to 16 cents per barrel (\$9.4 million to \$24.6 million) more than average oil company prices.<sup>6</sup> This price differential represents less than 0.5 percent.

The SPR oil was acquired through 5 long-term contracts and 127 spot market purchases. For 56.5 million barrels of oil bought through long-term contracts, DOE and DFSC paid 3 cents per barrel less than the average long-term contract prices reported by oil companies. For 93.5 million barrels of oil bought on the spot market, DFSC paid from 12 to 28 cents per barrel more than the comparable oil company spot market purchases. However, much of this added cost occurred in the first 2 months that DFSC bought oil on the spot market. From April 1981 to December 1982, DFSC prices ranged from 3 cents per barrel less to 15 cents per barrel more than comparable oil company spot market purchases.

In its comments on our September 1983 report and on this report, DOD questioned our spot market price estimation methods. In its August 23, 1985, comments, DOD stated that we compared DFSC prices to GAO estimates of spot market prices paid in the private sector at approximately the same time rather than to average oil company prices as we stated. In a sense DOE is correct in pointing out that we used GAO estimates of spot market prices rather than average oil company prices. However, in arriving at a price to compare DFSC purchases to, we relied heavily on the average of the prices that the industry trade journals reported for purchases from the same crude oil stream in the same time frame as the DFSC purchase. In some instances, we used individual prices if only one transaction was reported, or we used reported offers if no transactions were reported. The trade journals were considered by government and oil industry officials that we talked with during our audit work to be the most reliable source short of obtaining data directly from individual oil companies. DOE is not correct, however, in stating that the prices we used were from approximately the same time as the time of the DFSC purchases. Our prices were taken from the same week in which the DFSC purchases were made. We therefore believe the method of comparison we used was valid. We have, however, changed our report to more accurately state that DFSC purchases were compared to comparable purchases by oil companies.

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<sup>5</sup>A crude oil stream comes from one or more producing oil fields that are comingled and priced as a single entity. For example, Mexico has two crude oil streams, Isthmus and Maya, while Saudi Arabia has eight.

<sup>6</sup>Transportation costs generally were excluded from our comparative analyses. However, because many SPR spot market contracts showed only a single price that included both oil and transportation costs, we estimated the transportation cost and deducted it from the total contract amount to obtain the oil cost. The price range is due to differences in the SPR transportation cost estimates provided by DFSC and DOE.

CARGO PREFERENCE COMPLIANCE  
INCREASES OIL ACQUISITION COSTS

The SPR is subject to the Cargo Preference Act of 1954, which requires DOE to use commercial U.S.-flag tankers to transport at least 50 percent of the oil that is shipped in ocean-going tankers. This adds to SPR program costs because U.S.-flag tanker charter rates are higher than foreign-flag tanker charter rates. In return, the requirement benefits the U.S. merchant marine and may benefit DOD, which may need U.S.-flag tankers to respond to national security emergencies.

DOE is complying with requirements

DOE and the Maritime Administration, which administers federal government compliance with the Cargo Preference Act, have agreed to measure compliance in long ton-miles. This measurement accounts for the quantity of oil transported and the distance it is moved. Table 3.1 shows DOE's compliance since the inception of oil acquisition in 1977 through 1984. About 49 percent of long ton-miles were via U.S.-flag tankers. Since 1981, however, DOE estimates that U.S.-flag tankers have accounted for 53 percent of the long ton-miles.

Table 3.1

The SPR Program's Compliance with  
the Cargo Preference Act

<u>Year</u>	<u>U.S. flag</u>		<u>Foreign flag</u>	
	<u>Long ton-miles</u>	<u>Percent</u>	<u>Long ton-miles</u>	<u>Percent</u>
	(billions)		(billions)	
1977	1.4	16	7.2	84
1978	27.1	54	23.4	46
1979	2.8	30	6.6	70
1980	1.8	11	14.9	89
1981	41.0	45	49.3	55
1982	29.0	63	16.7	37
1983	20.9	62	13.0	38
1984 <sup>a</sup>	<u>26.9</u>	51	<u>25.4</u>	49
Total 1977-84	<u>150.9</u>	49	<u>156.5</u>	51
Total 1981-84	<u>117.8</u>	53	<u>104.4</u>	47

<sup>a</sup>preliminary data. The Maritime Administration verifies DOE data on a voyage-by-voyage basis.

Source: DOE.

### Added transportation costs

Compliance with the Cargo Preference Act adds to SPR oil acquisition and transportation costs. To estimate the added cost to the SPR of using U.S.-flag tankers in 1982 and 1983,<sup>7</sup> we compared actual and, in a few cases, estimated costs for chartering U.S.-flag tankers with cost estimates for chartering foreign-flag tankers on a voyage-by-voyage basis. For oil shipments to the SPR in 1982 and 1983, U.S.-flag tankers accounted for about 50 billion long ton-miles while foreign-flag tankers accounted for about 30 billion long ton-miles.

During 1982, ocean-going tankers delivered 63.3 million barrels of oil to the SPR. We estimated that DOE paid an additional \$59 million in 1982 to use U.S.-flag tankers instead of foreign-flag tankers. In 1983, ocean-going tankers delivered 85.3 million barrels of oil to the SPR. We estimated that DOE paid an additional \$43 million in 1983 to use U.S.-flag tankers instead of foreign-flag tankers. The 1983 additional costs were not as high because a greater percentage of oil deliveries came from Mexico, which had a lower U.S.-flag tanker cost per barrel of oil.

### SPR OIL ACCOUNTABILITY

Once DOE acquires oil, it must have controls to assure the validity of oil receipts, reported oil inventories, and oil quality. DOE has experienced a number of oil accountability problems since SPR oil acquisition began. DOE's Office of Inspector General has reported<sup>8</sup> on problems dealing with measurement of oil at SPR storage sites and marine terminals.

DOE has taken some actions aimed at correcting these problems. For example, in response to an Inspector General recommendation that all data and documentation pertaining to SPR oil accountability and inventory be audited by an independent accountant, DOE contracted with Peat, Marwick, Mitchell and Co. to evaluate the SPR crude oil accountability system and verify the crude oil inventory accounts. Peat, Marwick, Mitchell and Co. issued its report in May 1984. It concluded that, except for one material weakness, DOE's procedures from July 1977 through December 1983 were adequate to meet DOE's intended purposes, which include providing reasonable assurance that crude oil quantities are accurately recorded and supported by appropriate documents.

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<sup>7</sup>Detailed shipping data for 1984 were not available when we performed our audit work.

<sup>8</sup>Inaccurate Accounting for Oil Stored in the Strategic Petroleum Reserve (DOE IGA-79-19, Jan. 25, 1980) and Accounting for Oil Received and Stored in the Strategic Petroleum Reserve (DOE/IG-0188, Dec. 22, 1982).

The report stated that the material weakness resulted because, although accounting records were supported by document flow, they were not supported by periodic physical inventories of the oil in storage. Peat, Marwick, Mitchell and Co. did not test or review the related payments for crude oil acquisitions or verify either the quality or quantity of crude oil in the SPR inventory. DOE has been attempting to find a method of physical inventory verification but has not yet identified one that provides an acceptable degree of accuracy. Although DOE has not been able to verify the physical inventory, it does periodically take oil samples from each filled storage cavern for a quality analysis by the National Institute for Petroleum and Energy Research at Bartlesville, Oklahoma.

Another recommendation made by the Inspector General was for DOE to implement procedures to assure that oil losses from operations would be fully documented, investigated, and resolved in a timely manner. In response to this recommendation, DOE and DOD amended their interagency agreement, effective November 26, 1984, to tighten policies and operating procedures for identifying and pursuing in-transit marine oil losses. The amendment is for shipments when the government takes title to the oil at the port of origin because the government ultimately is responsible for any losses that occur in transit to the SPR marine terminals. The amendment defines losses that will be pursued as determinable losses, such as spills, contamination, fraud, or vessel inability to discharge pumpable oil quantities remaining on board, and non-determinable losses above 0.4 percent of the quantity loaded. (Some non-determinable losses are uncontrollable because of evaporation and other causes.)

DOE Program Office officials informed us that, since November 1984, DOE and DOD are working more closely on oil accountability matters and as a result there have been improvements in oil accountability practices, loss reporting, claims disposition, and a clarification of quality assurance personnel authorities. In addition, more analytical data are being gathered which are used to determine the magnitude of oil losses and where these losses occur.

## CONCLUSIONS

Since 1981, DOE has relied primarily on acquiring SPR oil through DFSC purchases on the crude oil spot market and long-term contracts with Mexico. During this period, when oil prices have fallen, this strategy has been economical and advantageous by minimizing oil acquisition costs and ensuring a regular supply of oil over a long period of time. We also found no cost advantages to using alternative sources of oil, such as the NPR or federal royalty oil for filling the SPR.

In purchasing crude oil for the SPR, DFSC has developed and followed procedures that generally assured that prices were fair and reasonable and government costs were minimized. DFSC could

have paid less, however, and still acquired oil of acceptable quality if it had been more flexible in its purchase practices by allowing exceptions, in certain circumstances, to its pricing criteria. We recommended in our September 1984 report that DFSC develop formal guidelines for making such exceptions and we continue to believe that more flexibility is needed to ensure that oil acquisition costs are minimized. DOD and DOE, however, believe that the existing practice has served to assure that the SPR receives full value for its oil acquisition funds and to best protect the interests of the government.

DOE's compliance with the Cargo Preference Act adds to SPR oil acquisition costs by requiring the use of more expensive U.S.-flag tankers and U.S. crews. DOE has used commercial U.S.-flag tankers to transport 49 percent of the SPR oil since oil acquisition began in 1977 and 53 percent of the SPR oil since January 1981.

#### AGENCY COMMENTS

Both DOE and DOD reiterated their positions that formal guidelines for making exceptions to DFSC's spot market pricing criteria are not needed. These positions were considered in our September 1984 report and are discussed in the body of this report.

## CHAPTER 4

### SPR USE DURING AN OIL INTERRUPTION MAY BE RESTRICTED BY DRAWDOWN AND DISTRIBUTION CAPABILITIES

To efficiently and effectively transport SPR oil to refinery markets depends both on the drawdown capability of federal government storage sites and on the distribution throughput capability of marine and pipeline terminals where ownership of SPR oil is transferred to the private sector. To respond to an oil supply disruption, DOE has established oil drawdown and distribution rates for each SPR development phase and each storage site complex.

Although DOE is able to withdraw oil from the SPR, there is uncertainty about its ability to draw down the SPR at design rates and the length of time these rates can be sustained. Further, as a result of reduced commercial crude oil pipeline availability, DOE will not be able to deliver SPR oil at its designated drawdown rate to the private sector until alternative pipelines are constructed and improvements are made to marine terminals associated with the SPR.

In conjunction with its development of drawdown and distribution capabilities, DOE has developed a market approach plan for selling SPR oil to the highest bidders during an emergency. The plan's market approach would, as intended, probably limit oil price increases in a severe supply disruption and would allow broad participation in the sale. Nonetheless, some potential problems exist relating to buyer participation under the plan.

#### THE SPR'S ABILITY TO DRAW DOWN OIL AT DESIGN RATES IS UNCERTAIN

The ability to withdraw the stored oil in large quantities is key to the SPR's role as the cornerstone of the government's energy emergency preparedness program. To accomplish this, each of the SPR's three construction phases were designed with specified oil inventory levels and drawdown capabilities. These are shown in table 4.1.

Table 4.1

Planned Oil Level and Design Drawdown  
Capability by Phase of Development

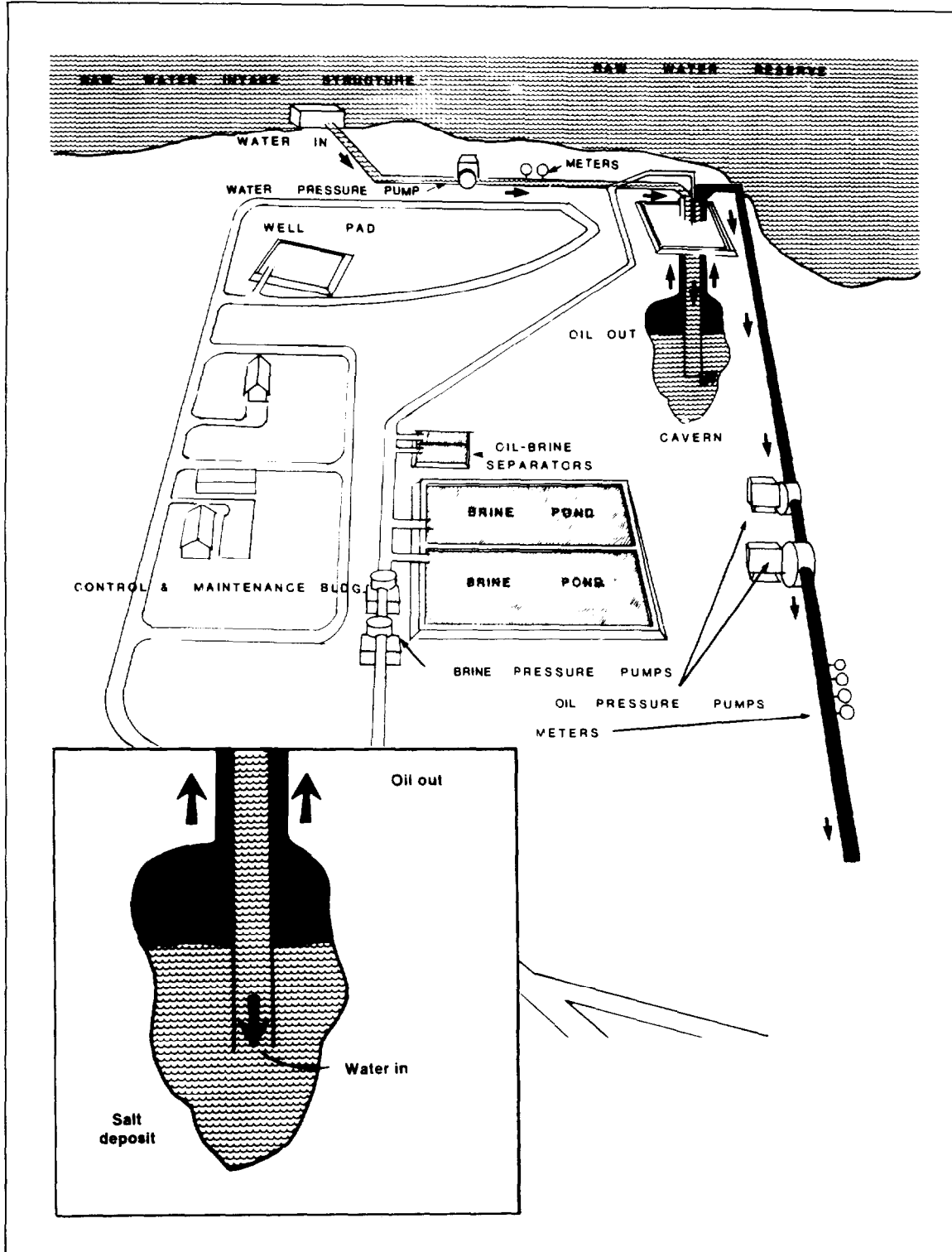
<u>Phase of development</u>	<u>Planned level of oil inventory</u>	<u>Design daily drawdown rate</u>
	----- (millions of barrels) -----	
Phase I	260	1.7
Phase II	550	3.5
Phase III	750	4.5

During a drawdown, the site equipment and connecting pipelines would be used to move the oil from the storage areas to the terminals for distribution to refiners by ship, barge, or commercial pipelines. (Figure 4.1 shows the oil withdrawal process.) Our September 1985 report entitled More Assurance Is Needed That Strategic Petroleum Reserve Oil Can Be Withdrawn as Designed (GAO/RCED-85-104) found some assurances that DOE could achieve its drawdown rate when phase II is completed but that technical and operational problems in key SPR components and systems raise uncertainties about DOE's ability to meet and sustain its drawdown rate.



Figure 4.1

Drawdown Process at a Typical  
SPR Salt Cavern Site



Source: DOE

DOE's ability to achieve phase II drawdown rate is uncertain and needs further testing

The SPR's effectiveness in an oil disruption is based on a high daily rate of withdrawal and how long the drawdown can be sustained. A high daily rate of withdrawal is important because it provides the option of quickly replacing all or a large part of the oil supply disrupted. This action could dampen the rate of initial price increases during oil disruptions, thereby mitigating some of the adverse economic impacts of a disruption. For example, oil prices tripled after the 1973-74 embargo and rose another 150 percent following the 1979 Iranian oil cutoff, adversely affecting the Gross National Product and the employment rate. The price increases also resulted in panic buying and hoarding, which cause shortages of and higher prices for petroleum products such as gasoline and heating oil. The ability to sustain a drawdown over a reasonable length of time is important because it provides assurance to the public and industry that oil supplies will be available on a continuous basis, thus dampening the tendency to hoard crude oil and/or petroleum products.

We reported that DOE has not conducted a full-scale test to assess its ability to successfully withdraw oil from all five SPR storage sites. Instead, it has relied on several other activities as a means of determining that design drawdown criteria will be met at successive stages of site completion. These activities include (1) computer model simulations of site-specific drawdown capabilities, (2) cavern leaching operations at the phase II sites, and (3) selected test oil withdrawal exercises. We concluded that while these activities provide DOE some assurance, each activity has its limitations. To provide greater confidence in DOE's drawdown capability, we recommended that DOE test the system and components to allow an assessment of SPR capability to meet drawdown goals while recognizing the trade-off between cost and level of assurance gained.

Computer simulation results require optimistic assumptions

DOE developed a computerized site operations planning model that simulates SPR site operations during drawdown. DOE has used the model to simulate the drawdown rate that would be sustained when phase II has been completed and all of the equipment is operating according to design specifications. The simulation showed that when the individual rates projected for each site are combined, the SPR meets the design drawdown rate of 3.5 million barrels per day for 107 days.

We reported that the model, however, assumes that all currently needed modifications to equipment and facilities have been completed and all equipment operates at designed performance levels. Therefore, we believe that the assumption reflects an ideal situation which may be difficult to achieve and/or sustain under actual operating conditions and may produce a higher level of confidence than is warranted. As discussed in our drawdown

report and later in this chapter, DOE faces a number of technical problems in assuring that the drawdown systems operate as designed.

Leaching experience provides some evidence of drawdown sustainability

DOE has been developing caverns for oil storage by pumping water into wells drilled in underground salt domes to dissolve the salt and pumping out the resultant brine. Crude oil is pumped into the caverns as space is created. Oil is withdrawn by pumping water into the bottom of the caverns and forcing oil out into the on-site pipeline systems. Since much of the equipment used in this leach/fill process is also used to withdraw oil, DOE points to its successful experience with this process over the last several years and a historic equipment availability rate of over 95 percent as an indicator that design drawdown rates could be sustained.

We reported that our analysis of the cavern leaching program at the two largest SPR sites showed, however, that the high levels of equipment availability during leaching do not fully indicate that the same availability levels will be sustained during actual drawdown operations due to the lesser quantities of water needed for leaching than drawdown. For example, the West Hackberry site has four water intake pumps. Two of the four pumps should have been more than adequate for leaching requirements. This left two pumps as spares and provided a high level of pump availability. To achieve the site design drawdown rate, however, requires the full output of three pumps, leaving only one spare pump. In addition, at Bryan Mound three pumps were usually run at 75 percent or less of their full output capacity. To achieve design drawdown rates will require the sustained performance of the three pumps at nearly full capacity.

Drawdown tests were limited in scope

DOE has conducted a number of 1-day tests at three storage sites to show that oil can be withdrawn from the SPR. While the tests met their objectives, DOE had to use more equipment than anticipated to achieve those objectives. Consequently, although the 1-day tests showed that oil can be withdrawn from the SPR, they provide limited confidence that the SPR will be able to achieve its design drawdown goals.

DOE has not comprehensively tested the drawdown capability of the Sulphur Mines or Weeks Island sites. The Sulphur Mines site has not been tested because DOE does not consider the site structurally suitable for more than a single drawdown. Weeks Island has not been tested because DOE has relied on the results of periodic withdrawals of oil from the site while exercising the equipment and cleaning the Weeks Island-St. James terminal pipeline.

As a result of its testing program, DOE has demonstrated an ability to move about 2.3 million barrels of oil over a single 24-hour period at three of the five sites. As additional caverns are completed, filled, and prepared for drawdown, DOE expects to increase this amount. How much additional oil that could be drawn down from these sites, as well as the amounts that could be obtained from the untested sites, still remains to be demonstrated.

The withdrawal tests conducted at three SPR sites were designed to demonstrate that site equipment could withdraw oil. They were not intended to demonstrate that the three sites can achieve the drawdown rates required for a phase II drawdown or to show that drawdown rates could be sustained. According to Project Office officials, more extensive tests were not possible when the tests were conducted because oil inventories were not adequate to achieve higher rates and because the tests would disrupt on-going leaching activities. DOE now is in a better position to test the SPR at the phase II drawdown rate because the oil inventory at all sites, except Bayou Choctaw, is adequate to test the design rate. DOE officials informed us that they are planning drawdown demonstrations at SPR sites, including Weeks Island, during fiscal year 1986.

We discussed the costs, limitations, and expected benefits of various SPR drawdown test scenarios involving oil sales or storage in a May 1985 report entitled Analysis of Oil Withdrawal and Distribution Tests for the Strategic Petroleum Reserve (GAO/RCED-85-115). We pointed out that:

- To provide maximum confidence in the SPR system's total reliability, it should be tested at either design capacity or at the maximum capacity permitted by the conditions existing when the test is conducted.
- Tests that include oil sales would cost more than tests that move oil to temporary storage facilities and return it to the sites after the test. In addition, test costs increase in direct proportion to the quantity of oil withdrawn. However, while storage-oriented tests and small oil-volume tests are less costly, they do not provide the same opportunities to assess the SPR system as tests that involve oil sales and higher oil volumes.
- Although there is no defined time period that the SPR should be operated to test system reliability, engineers familiar with the SPR, or with equipment comparable to that used by the SPR, believe that a reasonable testing time is 5 to 7 days.

As discussed in our report, a test could be designed that would stress the SPR system by maximizing both oil withdrawal and distribution capacities and could be sustained as long as desired. Such a test would involve storing some of the withdrawn

oil in tanks at the SPR's marine terminals and loading the remaining oil onto ships or barges or distributing it by pipelines. Such a test, using a combination of sales and storage and the maximum volumes of oil that can be withdrawn and distributed, could minimize the limitations of a storage-only test, reduce the costs associated with a sales-only test, and stress the capabilities of the SPR equipment.

#### Recent legislative actions affect SPR testing

The Energy Policy and Conservation Amendments Act of 1985, which was enacted on July 2, 1985, provides for an SPR drawdown and distribution test. The legislation provides for a test through the sale or exchange of about 1.1 million barrels of crude oil from the SPR storage within 180 days after passage of the act. Although the intent of the drawdown exercise is to test the bidding and purchasing process for the oil, we continue to believe that in order to test its total reliability, the SPR system should be tested at either design capacity or the maximum capacity permitted by conditions existing when the test is conducted.

Because the requirement for an SPR test was contained in legislation recently enacted, funds for its execution were not included in the fiscal year 1986 budget submitted to the Congress. As a result, DOE submitted to the cognizant congressional committees on September 17, 1985, a request to reprogram about \$500,000 of appropriated funds for this purpose. Pending final resolution of this matter, DOE officials are proceeding with preparations for a test sale of oil as required in the Energy Policy and Conservation Amendments Act.

#### Capability to sustain a drawdown is uncertain because of piping and equipment problems

DOE's ability to successfully draw down the SPR at its phase II design criteria of 3.5 million barrels per day is contingent on its ability to remedy several technical and operational problems at the various SPR storage sites. These problems occurred because of poor project management procedures during the early years of SPR development. They are briefly discussed below and covered in more detail in chapter 5 of this report, which addresses DOE's management of the SPR.

We reported in our September 1985 drawdown report that some drawdown-critical piping is restricted by marine growth or has been damaged by corrosion. We found that the water intake system at the two largest storage sites may not be capable of supplying enough water to achieve the phase II design drawdown rate without using in-line spare pumps unless appropriate measures are taken to keep the pipelines free of obstructions. In addition, we found that DOE did not devote adequate attention to maintenance, did not adequately develop and implement logistics support, and has not

completed automated control systems that would facilitate a sustained drawdown.

During 1984, DOE focused its attention on resolving problems that could affect oil drawdown capability. Consequently, several corrective actions have been taken, such as initiating a program to determine the rate of corrosion in all pipelines. DOE stated that it does not believe that the technical and operational problems noted by GAO will prevent the achievement of drawdown performance. However, until all of these problems and uncertainties are resolved, we believe DOE's ability to successfully sustain a drawdown at the phase II design rate will remain uncertain. We therefore recommended that DOE take specific corrective actions to resolve piping and equipment problems.

#### DRAWDOWN RATES ARE CONSTRAINED BY LIMITED DISTRIBUTION CAPABILITY

The SPR's distribution capabilities have been limited by the sale of two of the three commercial pipelines that DOE planned to use for transporting SPR oil during a supply disruption. Until proposed improvements are made, distribution will be limited to a maximum rate of 2.4 million barrels per day.

A main consideration in locating SPR storage sites was access to existing pipelines (Seaway, Texoma, and Capline) and marine terminals used by the oil industry. In 1984, both Seaway Pipeline, Inc., and Texoma Pipeline Company sold their pipelines that carried crude oil imports from the Texas Gulf Coast to the Midwest. The new owners are converting the pipelines for natural gas transmission.

To address this loss in distribution capabilities, DOE studied alternative ways of enhancing future SPR distribution capability. Further, DOE requested the National Petroleum Council (NPC) to study SPR distribution capabilities. DOE concluded that, if no distribution system changes are made to compensate for the pipeline sales, the SPR will be limited to a distribution rate of 2.4 million barrels per day instead of the original 4.5 million barrels per day rate. To increase the rate to at least 4 million barrels per day, DOE proposed to construct pipelines connecting SPR facilities to two Gulf Coast refining centers and four more marine terminals. DOE estimated that these projects would cost about \$97.2 million--\$85.2 million for construction of DOE-owned pipelines and \$12 million for modifications and tie-ins to commercially owned facilities.

In October 1984, DOE informed the cognizant congressional committees of these proposed distribution enhancements and of its proposed action to reprogram from phase III activities about \$49.5 million in fiscal year 1985 funds for these enhancements. In January 1985, the committees approved a portion of the reprogramming proposal (about \$42.3 million) for those enhancements relating to SPR facilities which would not be

affected by any program changes due to the administration's proposed moratorium on SPR development. According to DOE, completing the approved enhancements will provide a maximum initial distribution capability of about 3.25 million barrels per day by 1987. DOE estimates that an additional \$32 million would be needed in fiscal year 1986 to complete the enhancements. We are currently looking into the issue of the government paying for improvements to the commercially owned facilities that serve the SPR.

On December 12, 1984, NPC approved a report prepared by its Committee on the Strategic Petroleum Reserve entitled The Strategic Petroleum Reserve: A Report on the Capability to Distribute SPR Oil. The report recommended a series of measures to improve the SPR's distribution capability, including the enhancements associated with the October 1984 DOE reprogramming proposal to the Congress. In the report's transmittal letter to the Secretary of Energy, the NPC Chairman stated that while the NPC's analyses were based on the currently approved plan for filling the SPR to 750 million barrels, most of NPC's recommendations would still be applicable should a change be made in the ultimate level of SPR fill. According to the Secretary of Energy, DOE is proceeding in substantial agreement with most of NPC's recommendations.

Our June 5, 1985, report entitled Evaluation of the Department of Energy's Plan to Sell Oil From the Strategic Petroleum Reserve (GAO/RCED-85-80) discussed another potential impediment to SPR oil distribution: whether the legislative requirement to use U.S.-flag tankers for transporting SPR oil between two U.S. ports could lead to an oil tanker shortage. The Jones Act, Section 27 of the Merchant Marine Act of 1920 (46 U.S.C. 883), contains that requirement.

While the Jones Act can be waived in the interest of national defense, we reported that the potential need for a Jones Act waiver in a future energy emergency is thus far unclear. DOE officials and most oil company representatives we interviewed have argued that an advance blanket waiver of the Jones Act may be needed to compensate for a potential shortage of U.S.-flag tankers. The maritime industry, however, supported by the U.S. Maritime Administration, has argued that such a blanket waiver would be unnecessary because sufficient U.S.-flag tanker capacity exists to accommodate an SPR drawdown.

The December 1984 NPC report was also inconclusive about a potential shortage of U.S.-flag tankers. The study found that

"the supply of U.S.-flag tankers and barges in 1990 (projected to be about 8.3 million deadweight tons) appears sufficient to meet the waterborne crude oil transportation requirements of an emergency drawdown of the SPR."

Although the NPC estimated that, in a hypothetical oil shortage, the U.S.-flag fleet would fall short by about 1 million deadweight tons, the report concluded that such a shortage could probably be met by the existing case-by-case waiver procedure. However, the study also projected declines in U.S.-flag product tankers that could result in a substantial shortage of U.S.-flag tonnage for the distribution of certain types of fuel oil during a supply disruption.

We concluded that without more conclusive information about a potential U.S.-flag tanker shortage and the need to waive the Jones Act in an oil emergency, it is difficult to say what should be done to assure that a U.S.-flag tanker shortage would not impede the sale and distribution of SPR oil.

#### DOE's PROPOSED DISTRIBUTION METHOD--PRICE-COMPETITIVE SALES

The SPR can serve as a "first line of defense" in another oil crisis only if the oil can be sold quickly and efficiently to oil market participants. Taking a market approach to the oil's distribution, DOE plans to award SPR sales contracts to the highest bidders at periodic auctions. All interested parties who agree to DOE's contract terms and conditions would be considered eligible buyers.

In our June 1985 report on DOE's plan to sell SPR oil, we reported that the plan would, as intended, probably limit oil price increases in a severe supply disruption and would allow broad participation in the sale. We found, nevertheless, some potential problems relating to buyer participation under the plan:

--Allowing all interested parties access to the SPR, as planned, may pose some risks that outweigh the potential benefits cited by DOE. Under the DOE plan, for example, a hostile foreign power could buy the oil, an occurrence that could undermine the SPR's public support. A related issue--whether to allow brokers and traders access to SPR oil--is more ambiguous. Allowing them access may present problems with public acceptance, particularly since they are not directly involved in the oil refining business. However, their participation could add flexibility to the SPR distribution system and facilitate oil transactions during a disruption.

--There is no limit on the amount of SPR oil that a bidder could purchase at a given sale, opening the possibility that a few buyers could get all or most of the oil. Such an occurrence could impair the SPR's public support.

We concluded that these issues needed further clarification by the Secretary of Energy and consideration by the Congress. Therefore, we recommended that the Secretary of Energy reexamine



his position on these issues and transmit to the Congress a report specifying whether any restrictions should be placed on the eligibility of foreign buyers or brokers and traders to buy SPR oil, and whether there should be a limit on the amount of oil that a buyer can purchase at a given sale. Further, if the results of the study warrant it, the Secretary should submit appropriate amendments to the SPR sales plan. Because DOE comments on a draft of our DOE sales plan report did not respond to this recommendation, we also recommended that the Congress pursue these matters with DOE in hearings or in other ways that it may deem appropriate.

Other key findings in our report included the following:

- Some portion of the SPR oil sold, like any oil, would probably be retained in private inventories, rather than refined promptly and used to alleviate product shortages. This type of inventory behavior would diminish (but would not eliminate) the SPR's potential price benefits. However, attempts to legislatively or administratively prevent retention of SPR oil in inventories would probably have little effect.
- While economic theory suggests that selling SPR oil would dampen the rise in oil prices in a shortage, concern remains that a competitive sale could lead to the sale of SPR oil at above market prices, a development that, it is argued, may lead world oil prices higher than they would otherwise go. However, our analysis suggested that any such "price leadership" effect would be limited and temporary and therefore unlikely to override the price-dampening effect achieved by adding oil supplies to a tight world market.
- The Jones Act requirement that SPR oil moving between U.S. ports be shipped on U.S.-flag tankers, could give an advantage to buyers that own or have assured access to these vessels while discouraging others from bidding because of the penalties imposed for failure to pick up purchased SPR oil within the time specified in the sales contract.

## CONCLUSIONS

The ability to efficiently and effectively transport SPR oil to refinery markets depends on the ability to draw down, distribute, and sell the oil. DOE has established oil drawdown and distribution rates for each development phase as well as a plan for selling the oil. However, DOE has not provided a high level of confidence in its ability to achieve the SPR's drawdown rate of 3.5 million barrels per day when phase II is completed. In addition, DOE's ability to draw down the SPR at 3.5 million barrels per day is contingent on its ability to remedy several technical and operational problems at the various SPR storage

sites. Further, DOE's ability to draw down the SPR oil will be limited to 2.4 million barrels per day until DOE improves the distribution system. DOE's planned completion of these improvements will provide a maximum initial distribution capability of 3.25 million barrels per day by 1987.

DOE's method of selling SPR oil would, as intended, probably limit oil price increases in a severe supply disruption and would allow broad participation in the sale. However, certain aspects relating to buyer participation could impair public confidence in the SPR and therefore need further study by DOE. These include whether to restrict SPR purchases by certain foreign buyers (including a hostile foreign country), as well as brokers and traders, and whether to limit the amount that a single buyer could purchase at a given sale.

The recommendations discussed in this chapter from our prior reports should, if implemented by DOE, improve its capability to withdraw oil and strengthen its plan to sell oil from the SPR.

#### AGENCY COMMENTS AND OUR EVALUATION

DOE commented that it believes there is substantial evidence to support a conclusion that SPR design drawdown rates can be achieved and sustained over an extended period. DOE believes that the results of its recent computer simulations and analyses of site system availabilities, and its leach/fill experience, support its capabilities to meet or exceed drawdown performance criteria. DOE also took exception to our use of cavern-leaching water flow rates as an indication of expected drawdown flow rate capabilities.

We have revised our report to reflect those comments as well as additional technical data and updated computer model simulation runs that DOE provided on our draft drawdown report. This has resulted in some tempering of our initial concerns about DOE's ability to sustain a design drawdown rate.

We agree that DOE's model simulation and system availabilities provide some assurance that drawdown rates can be achieved. However, we noted that the model simulation results require assumptions about future site operations and performance levels that may be difficult to meet and sustain under drawdown conditions. Based on the history of problems at SPR sites and DOE's seeming lack of attention to some of these problems, we are less confident than DOE about its ability to make all the necessary changes and that the system will operate as designed throughout an extended drawdown period as indicated by the model. We also noted that the system availabilities referred to were developed under leaching conditions that were somewhat less rigorous than a full drawdown will impose on the system.

Much of the uncertainty we noted about meeting drawdown requirements focused on the raw-water systems. We recognize that

DOE is planning changes to this system, but until they are completed and tests are made to ensure that adequate supplies of water will be available on a sustained basis, the uncertainty will remain. We agree with DOE that leach flow rates, as discussed in the draft of this report, are not directly comparable to drawdown flow rates and we have modified our final drawdown report and this final report accordingly.

DOE reiterated its comments regarding sales to foreign entities that were considered in our June 1985 report. It stated that actions to restrict foreign entities from bidding for SPR oil could be circumvented by the establishment of a U.S. shell corporation or the like. It also said that the SPR sales provisions permit DOE to reject a bidder as nonresponsive based on evidence of a lack of integrity that diminishes confidence in the bidder's prospective contract performance. As we said in our June 1985 report, we acknowledge that restrictions on foreign access to SPR oil could not guarantee that all oil would be used in the United States; however, we believe that some restrictions could make it more difficult for undesirable foreign buyers (such as a hostile foreign buyer) to acquire SPR oil. We also stated in our June 1985 report that there is no necessary relationship between being a hostile foreign power and a lack of integrity and nonresponsibility, since a hostile foreign power may have every intention to perform responsibly under its contract for SPR oil.

DOE commented that it disagreed that participation by brokers and traders may present problems with public acceptance and stated that many companies rely on brokers and traders for acquiring oil. We recognized in detail the importance of brokers and traders and the flexibility they add to the SPR distribution system in our June 85 report. That report also pointed out that allowing brokers and traders access to SPR oil poses some potential problems, such as speculating in the oil. If oil were used for private speculative gain, we expressed concern that the public could lose confidence in the SPR plan and the government's overall emergency response could be undermined. Our report did not recommend prohibiting brokers and traders from buying SPR oil, only that DOE consider whether any restrictions should be placed on their eligibility to buy SPR oil.

DOE also commented that limiting the amount of oil that a bidder could purchase would be contrary to established sales procedures in a free market and a competitive sales approach for SPR oil. DOE added, however, that this concern is being examined.

## CHAPTER 5

### EARLY MANAGEMENT PRACTICES AT THE SPR WERE NOT EFFECTIVE, BUT IMPROVEMENTS ARE BEING MADE

The SPR has experienced a wide range of management and internal financial problems since its inception. Many of these problems occurred because project management procedures were poorly implemented during the SPR's early years. Some problems have persisted because, until recently, DOE concentrated its efforts on developing storage capacity and filling the SPR as quickly as possible. Because of this emphasis, management often gave inadequate attention to other aspects of the SPR. As a result of this lack of management attention:

- Problems in key systems and equipment raise uncertainties about DOE's ability to sustain a drawdown at the design rates.
- Weak management controls did not provide adequate oversight over contractor activities.
- Weak internal financial controls did not adequately manage and safeguard federal funds.

Recognizing the need to improve SPR management, DOE has taken some actions that it believes will correct the situation. These include addressing problems that could affect the SPR's drawdown capability; assigning overall SPR project management responsibility to DOE's Oak Ridge Operations Office and combining and centralizing contractor activities into one consolidated management, operation, and maintenance contractor under a structured system of DOE oversight; and improving internal financial controls.

While it is too early to tell how effective DOE's actions to improve SPR management will be, they are a step in the right direction. Nevertheless, we have some concerns about DOE's management approach and the adequacy of the improvements made.

### PROJECT MANAGEMENT WEAKNESSES DURING THE SPR'S EARLY YEARS AFFECT DRAWDOWN CAPABILITY

In the early years of SPR development, there was pressure from the administration and the Congress to store oil in the SPR as quickly as possible. During that time, oil imports were still increasing and there was a high level of concern about the potential adverse economic impact of another oil supply disruption. To expedite oil storage, DOE decided to accelerate the design and construction of the SPR and put the program on a "fast-track," or accelerated, basis.

Although a fast-track approach can be an acceptable project management technique when exigencies make it necessary, its use should be accompanied by an increased level of project management attention. Our September 1985 report entitled More Assurance Is Needed That Strategic Petroleum Reserve Oil Can Be Withdrawn as Designed (GAO/RCED-85-104) found that DOE did not accompany its accelerated program with the requisite management control and oversight needed to ensure that program specifications and performance criteria were met. We found management attention lacking in DOE's quality assurance program, corrosion control program, site maintenance, and systems development. As a result, problems with equipment and systems could adversely affect DOE's ability to draw down the SPR as designed. During 1984, DOE focused its attention on resolving many of the problems that could affect SPR drawdown capability and initiated corrective actions in a number of areas.

Weak quality assurance program during initial construction period

DOE did not emphasize a quality assurance program during the SPR's early design and construction period. Because the quality assurance program was not effective when most of the equipment and piping was purchased and installed, questions remain about the pipelines' capability to withstand a drawdown. Since 1979, DOE contractors have reviewed and raised concerns about the integrity of pipeline welds and fittings that illustrate the uncertainties that still exist. We reported that DOE began taking corrective actions on these concerns during 1984. However, there have not been sufficient tests made of the system to negate the concerns raised.

Initial corrosion control program was inadequate

DOE did not implement a comprehensive corrosion control and monitoring program when it constructed the SPR pipelines. These pipelines are used to move raw water to the sites to flush oil from the caverns and to move the oil from the sites to the distribution terminals. Delays in implementing an adequate control program have led to substantial internal corrosion and marine growth problems in sections of certain pipelines. As a result, restrictions and/or corrosion in certain drawdown-critical pipelines may affect DOE's ability to sustain a drawdown at the design level. We found that marine growth and debris in the raw-water pipelines at Bryan Mound and West Hackberry restrict the flow of water needed for drawdown. We also found that corrosion existed in the West Hackberry raw-water pipeline and in the Bayou Choctaw-St. James oil pipeline.

Although DOE was aware that these problems existed, it took up to 2 years to initiate actions to determine the extent of the problems. Additionally, DOE did not try to determine whether similar problems existed in other SPR pipelines until late 1984.

DOE believes that the actions it has taken or has planned will enable the sites to meet their drawdown design rates.

Site maintenance was not given adequate attention

Maintaining SPR equipment was not given adequate attention until the Oak Ridge baseline assessment report was issued in October 1983. According to that report, serious maintenance problems existed at the SPR sites and a loss of drawdown capability could be expected unless maintenance was improved. In response to the report's recommendation, the Project Office has acted to improve site maintenance and has reduced the backlog of maintenance work needed at the sites. DOE believes it could accomplish all essential maintenance work within 30 days and thus the maintenance backlog would not affect its drawdown capability.

Logistics support development has been slow

DOE has had problems completing an integrated logistics support (ILS) system for the SPR. Among other things, logistics support includes spare and repair parts, support equipment, tools, warehousing, technical documentation, computerized inventory control systems, and associated personnel. An ILS system should be developed during the initial design of a project so that maintenance, spare parts, and warehousing requirements can be established and incorporated into the project's design and operation.

In our April 1984 report entitled Additional Improvements Needed in Logistics Support for the Strategic Petroleum Reserve (GAO/RCED-84-12), we reported that DOE did not include logistics support planning in the SPR's initial design because DOE emphasized storing oil underground as quickly as possible. Subsequently, problems such as lack of equipment standardization, which an ILS system is intended to prevent, surfaced. DOE initiated ILS system planning after the problems arose in late 1978; however, it did not effectively manage this effort. DOE did not clearly define the scope of work in its operation and maintenance contract and had to modify the contract to add the ILS responsibilities at an increased cost of \$4.1 million. DOE's subsequent lack of close surveillance, however, resulted in the contractor's using most of these funds on other activities that DOE was emphasizing, such as those relating to oil fill. A change of contractors in January 1982 brought some improvements, but progress at existing sites has been slower than expected.

In order to avoid the problems that occurred at existing sites, our ILS report made recommendations aimed at improving the development of the ILS system at DOE's new phase III site at Big Hill. DOE concurred with our recommendations and initiated actions aimed at ensuring adequate logistics support at Big Hill.

In our September 1985 drawdown report, we stated that during 1984, DOE continued to work on the ILS system, but according to DOE, the system's data base would not be sufficient to accurately determine spare parts requirements until early 1986. Nevertheless, spare parts have been acquired for the SPR during the past year which DOE officials believe provide adequate support for drawdown-related operations. These officials acknowledge that as additional operating experience is gained, adjustments to the spare parts inventory will probably be necessary.

Automated instrumentation and control systems are not complete

DOE's early management problems are also illustrated by the difficulties it experienced in completing automated instrumentation and control systems at the SPR storage sites. These systems are designed to operate and protect critical field equipment such as pumps, motors, and valves from a central control room at each site. The combination of control room computers and sensory devices on the field equipment is to be used not only to operate pumps and valves, but also to detect equipment malfunctions and initiate corrective action before serious damage occurs.

In May 1983, at congressional oversight hearings, we discussed DOE's early management problem in developing workable instrumentation and control systems.<sup>1</sup> We testified that DOE had been working on these systems since 1977 but that the systems at the two largest sites--Byran Mound and West Hackberry--had not been completed. We reported that:

- DOE, uncertain as to what it wanted in an instrumentation and control system, made 68 modifications to the original contract. These increased costs by \$4.6 million and extended the contract by about 2 years.
- DOE did not adequately monitor or coordinate the numerous contractor activities underway at Bryan Mound and West Hackberry. DOE had the contractor installing the systems at the same time it had other contractors developing the storage caverns and accessory facilities. As a result, field instruments or cables were frequently broken or damaged.
- The original contractor never made the systems operational. DOE negotiated a settlement with the contractor, accepted the systems on an "as is" basis, and paid the contractor an additional \$1.7 million.

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<sup>1</sup>Hearings on the management of the SPR before the Subcommittee on Environment, Energy and Natural Resources, House Committee on Government Operations, May 24, 1983.

DOE continued to experience difficulties in completing the systems at the Bryan Mound and West Hackberry sites in 1983 and 1984. The Bryan Mound system was to have been completed by April 1986; however, a bid protest on the contract award for integration of the control room delayed the completion date until June 1986. Project Office officials informed us that the West Hackberry instrumentation and control system was completed in March 1985 and tested in May and June 1985. DOE considered the test successful and assumed custody of the instrumentation and control system. However, additional electrical work is planned under a separate contract to convert the water intake structure control system from a manned to an unmanned operation. This work is expected to be completed in January 1986.

#### DOE HAD NOT EFFECTIVELY CONTROLLED CONTRACTOR ACTIVITIES

DOE has relied on numerous contractors to design, construct, operate, and maintain the SPR storage facilities. Since inception of the SPR, DOE has awarded about 273 commercial contracts (excluding oil purchases and interagency agreements) totaling about \$1.9 billion involving a mix of fixed-price and cost-reimbursable types of contracts. Although DOE had procedures available for controlling and monitoring contractor activities, it had not effectively implemented these controls.

Fixed-price contracting is the preferred method of government contracting as long as the circumstances are conducive to its use, and DOE has made extensive use of this contracting method. Of the 273 commercial contracts, 238 were fixed price. However the large dollar value contracts tend to be cost-reimbursable. For example, 71 percent of the nearly \$1.9 billion in contract costs to date has been for cost-reimbursable-type contracts. As of December 1984, the time of our field work, DOE had \$849 million worth of outstanding SPR contractual commitments and about \$636 million (about 75 percent) were of the cost-reimbursable type.

Cost-reimbursable contracts place most of the cost and performance risk on the government. While the use of cost-reimbursable contracts is appropriate in certain circumstances--e.g., when there are uncertainties about how a project can be developed or when there is no reasonable basis to estimate costs--federal procurement regulations express a preference for fixed-price contracts. The procurement regulations also encourage agencies to move to fixed-price contracts as the project becomes more defined. This shifts the burden of risk from the government to the contractor.

#### Contractors were not effectively controlled

The procurement regulations state that before a cost-reimbursable contract is awarded, the agency must assure that the contractor has an adequate accounting system so that the agency can determine that only allowable costs are charged to the



contract and that adequate government surveillance of the contractor is provided. However, DOE did not ensure that its contractors had adequate accounting systems and that appropriate controls over the contractors were implemented.

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The Defense Contract Audit Agency (DCAA) had reported deficiencies in the accounting systems used by the SPR's security, architect and engineering, and operation and maintenance contractors. The most serious problems DCAA found were in the operation and maintenance contractor's system. DCAA had not approved this system before the original contract term had expired. Because of these problems, DOE has had little assurance that the costs charged by the contractor were allowable within the context of the contractor's scope of work. We had also noted in our April 1984 report entitled Additional Improvements Needed in Logistics Support for the Strategic Petroleum Reserve (GAO/RCED-84-12) that the cost of developing the ILS system was uncertain because of the way some of DOE's contractors maintained their accounting records.

In addition to not assuring that its cost contractors had adequate accounting systems, DOE did not exercise adequate management oversight or control over its cost-reimbursable contractors' activities. We have pointed out weaknesses in these controls in previous reports. For example:

- We identified problems in DOE's use of the award fee, one of the main tools DOE has available to motivate contractors to achieve high performance levels. Our April 1984 report on logistics support found that DOE had paid award fees to its two former operation and maintenance contractors for logistics support system work that was behind schedule or incomplete. As a result of our recommendation to DOE to improve its use of the award fee, DOE informed us that it had revised its SPR contract award fee process to conform to established and proven procedures and policies used by the Oak Ridge Operations Office.
- We discussed weaknesses in another major control--the use of contracting officers' technical representatives to monitor contractor activities--in a November 1983 letter to the Manager, Oak Ridge Operations Office. The contracting officers' technical representatives are responsible for certifying that goods and services have been received from contractors before payment is made. However, we found that they were making such certifications without first-hand knowledge that the goods and services actually had been received.
- We also found that DOE lacked a sound quality assurance program, another important management control over contractor activities. As already discussed in this chapter, this control was not emphasized during the SPR's early years.

For cost-control purposes and for assuring effective contractor performance, it is imperative to have adequate controls over cost-reimbursable contractors. DOE should ensure that approved accounting systems are in place and functioning and that all of its contract monitoring procedures are fully and continuously implemented. These actions will help to ensure that the SPR is operated in the most efficient and economical manner.

INTERNAL CONTROLS OVER DISBURSEMENTS,  
RECEIVABLES, AND COLLECTIONS WERE WEAK

In addition to the identified weaknesses in its controls over contractor activities, DOE also had weaknesses in its controls over financial transactions and recordkeeping. An adequate system of internal controls has been recognized as an indispensable part of sound financial management. GAO and the Department of the Treasury provide extensive guidance to agencies on managing and safeguarding federal funds. Furthermore, agency heads are required by law (31 U.S.C. 3512) to provide effective controls and accountability over all funds for which they are responsible.

We issued two reports to DOE management on a number of internal SPR control weaknesses that needed correcting. In letters dated November 14, 1983,<sup>2</sup> and February 15, 1984,<sup>3</sup> to the Manager of the Oak Ridge Operations Office, we reported our concerns about weaknesses in disbursements, receivables and collections, and internal audit coverage at the Project Management Office. Our concerns were raised primarily because many of these activities did not meet GAO and Treasury requirements. As a result, the agency did not have assurance that all funds were properly managed, accounted for, and safeguarded. The Oak Ridge Operations Office generally agreed with our findings and initiated corrective actions as discussed below.

Controls over disbursements were weak

In our November 14, 1983, letter we questioned the adequacy of disbursement procedures in the Project Offices's Accounting Branch because the Branch did not have written criteria or systematic procedures for performing detailed voucher reviews. Further, the contracting officers' technical representatives' (COTRs') voucher certifications, a key element of the disbursement system, appeared to be superficial and did not assure that goods and services billed to the SPR were actually received. We pointed out that, as a result, payments were being made without an adequate review of their validity.

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<sup>2</sup>Internal Control Weaknesses Over Disbursements at the Strategic Petroleum Reserve Project Management Office (B-208196, Nov. 14, 1983).

<sup>3</sup>Weaknesses in Internal Controls Over Receipts at the Strategic Petroleum Reserve Project Management Office (B-208196, Feb. 15, 1984).

DOE generally concurred with the need to improve its internal controls over disbursements. It informed us that the Accounting Branch planned to implement a more organized and systematic procedure for performing more detailed voucher reviews. The procedure would include using statistical sampling techniques, tracking adjustments, and documenting reviews. DOE pointed out that an employee had been detailed to the Accounting Branch and had been given the responsibility of designing and implementing such a system. However, this employee resigned from the Project Office before the job was completed. Our follow-up work in November 1984 disclosed that the planned enhancements for performing detailed reviews of selected vouchers had not been fully implemented because additional personnel shortages had occurred along with a hiring freeze. DOE informed us in November 1984 that actions were being taken to fill vacancies and that, as candidates are identified, a waiver would be requested under the hiring freeze to fill the positions. According to DOE, the situation remained the same as of July 1985.

DOE also concurred that the COTRs' voucher certifications could be more effective. DOE informed us that the Project Office planned to develop and implement specific procedures to help the COTRs to more effectively substantiate claimed costs in connection with the Accounting Branch's proposed enhanced system of voucher examinations. In November 1984, DOE informed us that a task force had been established to develop and implement enhancements to the COTRs' responsibilities for monitoring and approving contractor-claimed costs for goods and services received. The task group would remain operational until all its objectives were accomplished.

Accounts receivable were not always  
appropriately handled

In our February 15, 1984, letter, we reported that the Project Office had inadequate controls over recording and collecting accounts receivable and depositing collections. We pointed out that, as a result, amounts due from contractors were inaccurately accounted for and DOE lacked assurance that all amounts due the government would be recovered. For example, overpayments to contractors were not consistently recorded, and some receivables were not recorded or closed out in a timely manner; delinquent accounts receivable were not receiving adequate management attention and were not being aggressively collected; collections of accounts receivable were not always being deposited in a timely manner; and responsibilities for collection activities were not properly segregated from other accounting duties.

DOE generally concurred with our findings and stated that corrective actions had been taken to resolve these problems. Our follow-up work in November 1984, however, disclosed that while DOE had developed new procedures aimed at improving controls over accounts receivable, the Accounting Branch did not have sufficient staff to fully implement the revised procedures. For example,

monthly assessments of accounts receivable were not being performed, accounts receivable aging schedules were not being distributed as planned, and collection activities were not being fully separated. DOE attributed this to personnel shortages in the Accounting Branch, further hampered by a hiring freeze. DOE informed us in November 1984 that actions were being taken to fill vacancies and that a waiver would be requested under the hiring freeze as candidates are identified. According to DOE, this situation remained the same as of July 1985.

#### Internal audits of SPR financial operations were inadequate

In our opinion, adequate internal audit coverage could have detected most of the control deficiencies discussed in the previous sections, thus providing management with the opportunity to correct them earlier. However, as discussed in our November 14, 1983, and February 15, 1984, letters, the Project Office did not have an internal audit staff, and DOE's Office of the Inspector General had been able to provide only limited audit coverage of the Project Office's financial operations.

DOE concurred that an internal audit staff is both necessary and vital to assure adherence to laws, regulations, and policies and to promote effectiveness, economy, and efficiency in its operations. It added that now that the Oak Ridge Operations Office has responsibility for SPR management, Oak Ridge's management evaluation staff will perform internal reviews. DOE said that the Operations Office and the Project Office have established certain procedures for performing internal reviews at the SPR until additional Project Office staff can be obtained. DOE added that with such assistance from the Operations Office, internal control reviews were begun during fiscal year 1984. DOE also informed us that the Inspector General had begun to evaluate existing controls over accounts receivable and disbursements. This evaluation is expected to be completed in the later part of 1985. It also pointed out that the Inspector General plans to use independent public accountants to perform additional internal reviews at the Project Office.

#### DOE RECOGNIZED NEED TO IMPROVE SPR MANAGEMENT

Recognizing that the SPR has had management problems, DOE has taken several actions aimed at improving the situation. These have included reorganizing SPR management; undertaking a major study to identify and correct problems at the SPR; and using a consolidated management, operation, and maintenance (MOM) contractor in lieu of the previous multi-contractor arrangement.

#### SPR management reorganized

The Secretary of Energy, in June 1983, transferred overall SPR project management responsibility from the Project Office in

New Orleans to the Oak Ridge Operations Office, while retaining program management responsibilities at the headquarters office. The Project Office retained day-to-day responsibility for the SPR consistent with the basic structure and roles of departmental components established soon after the formation of DOE in 1977. Until June 1983, the SPR was the only major DOE systems acquisition project that was not managed by a field operations office. In announcing the reorganization, the Secretary recognized that new, fresh management was necessary to manage the SPR and to independently review many allegations of mismanagement and misconduct identified by oversight organizations and the Congress.

Overall responsibility for project implementation and project management activities was assigned to the Manager, Oak Ridge Operations Office. Within the Operations Office these activities are managed through delegation of responsibility to designated personnel at both the Operations Office and the Project Office. An Office of Assistant Manager for SPR has been established within the Operations Office and the assistant manager has overall responsibility for SPR project management.

The Assistant Manager for the SPR told us that prior to the reorganization, the Project Office staff, which reported directly to the program office in Washington, D.C., was not skilled in effective management practices. Consequently, the Project Office did not set up and follow comprehensive management policies and procedures. The Assistant Manager believes that the transfer of management to the Operations Office will benefit the program by bringing time-tested management procedures and experience in running major projects to the program. Now that the program is part of the Operations Office, it will follow the same standard Operations Office procedures and be subject to the same oversight as the operating divisions and other major projects administered by the Operations Office.

#### Oak Ridge assessed the SPR Project Office's baseline status

After the reorganization, the Manager of the Operations Office initiated a review of the Project Office which resulted in a report establishing a baseline of the Project Office's status at the time of management transition. The Operations Office issued its baseline assessment report in October 1983.

Overall, the baseline report concluded that significant progress had been made in the SPR project and that the Project Office had played a significant role in the accomplishments to date. However, the report found many problems and made 170 recommendations for improving the reliability, efficiency, and continued operation of the SPR.

The report found that there had been insufficient oversight and monitoring of contractor accounting systems, cost controls,

contractor inventory systems, and prime contract administration. It stated that the Project Office's management effectiveness had been hampered by the large number of contractors it had to manage and the tendency of Project Office senior management to involve itself in low-level details (micromanagement) of contractor activities. According to the report, the large number of prime contractors required significant management oversight and integration activities and, with the scarcity of federal employees at the Project Office, the workload created had led to reduced effectiveness and reduced oversight. The report concluded that the use of a broader, more consolidated MOM contractor, in lieu of the extensive multicontractor arrangement then in place, would offer some distinct management advantages: better control over the contractor, lower costs, improved procurement and financial functions, and fewer contractor interface problems. The report recommended immediate action to consolidate selected prime contracts into a broader management, operation, and maintenance contract.

Following the issuance of the baseline assessment report, the Project Office issued a plan on December 29, 1983, to implement the recommendations. The plan called for completing actions on all the recommendations by March 31, 1985. As of March 31, 1985, DOE had officially closed out 146 of the 170 recommendations. However, as of April 10, 1985, the Project Office had proposed implementation actions for all 170 recommendations and the Operations Office had approved these proposed actions, thus, according to DOE, officially closing out all of the 170 recommendations.

MANAGEMENT, OPERATION, AND MAINTENANCE  
CONTRACT TO BE USED AT SPR

Pursuant to the baseline assessment's recommendation, the Operations Office in April 1984 requested proposals for the consolidated management, operation, and maintenance of the SPR. On December 27, 1984, DOE announced the selection of a contractor<sup>4</sup> and awarded a 5-year contract on March 28, 1985. DOE believes that this type of contract is an improvement over past practice because it provides for consolidating activities, improving performance accountability, improving contract administration, and extending the contractor's performance period.

A complete analysis of the effectiveness of this approach will not be possible until after the contract has been implemented. However, DOE will be relying on the same control techniques to manage the MOM contractor that it had available for previous contracts. Therefore, it is important for DOE to fully implement and utilize these controls so that past problems can be avoided.

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<sup>4</sup>The contractor selected was Boeing Petroleum Services, Inc., a subsidiary of Boeing Company.

## MOM contract provisions and purpose

On March 28, 1985, DOE signed a 5-year contract with Boeing Petroleum Services, Inc. The contract, effective April 1, 1985, was awarded on a cost-plus-fixed-fee basis for the first 6 months and will then convert to a cost-plus-award-fee basis. The contract can be renewed for up to 5 more years.

The purpose of the MOM contract is to obtain the necessary qualified personnel and services to manage, operate, and maintain the government-owned SPR facilities. DOE will retain responsibility for the overall project management and project technical direction, while the contractor will be responsible for the SPR's day-to-day management. Some of the more significant functions of the contract are to

- manage, operate, and maintain the storage facilities, the associated pipelines, and the St. James dock and terminal, including managing and integrating SPR operational activities;
- integrate systems and operational planning to achieve program objectives;
- manage all preventive and corrective maintenance and the integrated logistics support systems for the facilities;
- maintain and implement a quality assurance program;  
and
- manage and subcontract for assigned construction tasks at various facilities.

## MOM contract is expected to provide management benefits

According to the Manager of the Operations Office, the broader, more consolidated MOM contract will offer some distinct management advantages, such as better control over the contractor, fewer contractor interface problems, and improved procurement and financial functions. There will be continuity from establishing requirements through design, construction, and operation and maintenance. As a result, one contractor, rather than several, will be responsible and accountable for these activities.

The Manager of the Operations Office also believes that DOE and the MOM contractor will establish a very close working relationship. For example, the contractor's accounting system will be integrated with DOE's, and the contractor will be involved in the DOE budget process. This is expected to allow realistic annual budget projections and well-defined project objectives that can be used for planning and tracking progress. The manager also believes that better contractor performance will result because the base performance period for this contract will be for

5 years with a renewal option of up to 5 more years. He believes that this period is long enough to get the contractor to commit key career individuals to the SPR project.

One of the principal reasons for shifting to a MOM contract, according to the Manager of the Operations Office, was to place greater reliance for day-to-day SPR management in a single contractor. A single contractor would require fewer DOE resources than the current multiple-contractor arrangement. Thus, by using a MOM contractor, the DOE staff is expected to be able to perform more of an oversight role. Rather than direct the contractor as to how it should perform its functions, the DOE senior site representatives will participate in establishing goals and objectives for the MOM contractor and are expected to be in a better position to oversee and evaluate the contractor's performance at the sites in achieving those goals and objectives. In addition, DOE representatives are expected to have time to review, audit, and change direction of the contractor since they will not be involved in day-to-day activities.

The Manager and other Operations Office officials informed us that the Operations Office has had extensive successful experience with MOM contractors in the past. The Manager stated that the Operations Office brings with it some 40 years experience in utilizing MOM contractors to carry out DOE's missions and objectives. He added that the Operations Office has developed, implemented, and matured technical, fiscal, and administrative systems and procedures that have been tested and proven to provide the appropriate control and interface necessary to assure success in utilizing this type of contract.

DOE needs to ensure that management controls over MOM contractor are adequately implemented

To provide oversight of the MOM contractor, DOE plans to use essentially the same standard management controls which it had available for previous contractors. This report has pointed out that DOE's weak management controls over cost-reimbursable contractors did not result in adequate oversight or control of contractor activities. DOE believes, however, that a MOM contractor operating under proven Operations Office management techniques and under DOE orders, regulations, guidance, and oversight will be able to avoid many of the problems that the Project Office experienced in managing the SPR.

The Operations Office plans to use, among others, integrated accounting and budgeting systems, an award fee process, a quality assurance program, cost and schedule control systems, and audits and other evaluations to manage the MOM contractor. This chapter has already discussed that in the past DOE did not assure that its contractors had adequate accounting systems, did not make effective use of the award fee process, and did not assure the timely implementation of a quality assurance program. The



baseline assessment report had also identified problems with these controls, as well as with contractors' cost and schedule control systems not meeting DOE criteria and with inadequate audit coverage of contractors.

DOE told us in January 1985 that it will verify that the controls it will use to oversee the contractor's performance are adequate and in place at contract execution or the contract will provide dates when the contractor must have approved systems in place. For example:

- According to a Project Office official, the contractor's accounting system was considered acceptable, based on DCAA reviews, prior to contract award except for one manual aspect that was accepted in May 1985 after written procedures were developed. This official told us that the contractor's system was considered integrated with the DOE accounting system by April 30, 1985.
- The Operations Office plans to have a budget system fully integrated with the accounting system implemented by October 1, 1985.
- The MOM contractor will be required to fully implement an approved quality assurance program within 90 days from April 1, 1985.
- The MOM contractor will be required to demonstrate, within 180 days of contract award, the cost and schedule control systems to be used and their operability and conformance with DOE criteria.

In addition, DOE expects that a new award fee process, which has been revised to incorporate Operations Office procedures and policies, will help ensure that the contractor develops and implements the necessary controls. The Manager of the Operations Office told us that the award fee process provides for establishing specific performance areas for emphasis and that DOE will determine the amount of award fee to be paid, or not paid, based upon evaluation of the contractor's work. He added that this process provides considerable leverage in ensuring proper contractor performance and that the award fee process will be more stringently applied in the future.

DOE will have to ensure that these controls, and others, are fully developed and implemented if it is to effectively oversee and manage the MOM contract. Experience gained to date in managing the SPR and the Operations Office's experience with integrated MOM contracts could help ensure that adequate controls are put in place and utilized.

DOE Operations Office and Project Office officials recognize that one of the most difficult problems they will have in using the MOM contractor is getting DOE personnel to change the way they

interface with the contractor. Micromanagement of contractor activities was identified in the baseline assessment report as one cause of past problems in the SPR program. Operations Office officials also told us that they were developing a management plan setting forth interface responsibilities of Boeing Petroleum Services, Inc., and DOE operating groups, as well as expectations and bases for performance evaluation. According to these officials, this plan is expected to educate DOE and MOM contractor personnel on how each will operate, and this knowledge is expected to overcome DOE's micromanagement tendency of the past. The plan, however, is not expected to be finalized until October 1985.

## CONCLUSIONS

During the early years of SPR development, DOE concentrated its efforts on developing storage capacity and filling the SPR as quickly as possible. Consequently, management attention given to other aspects of the SPR was often inadequate. DOE has recognized the need to improve the SPR management and has taken some actions which it believes will correct the situation, such as assigning overall project management responsibility to DOE's Oak Ridge Operations Office, centralizing contractor activities in one consolidated MOM contractor, and improving internal financial controls. While it is too early to tell how effective DOE's actions to improve SPR management will be, they are a step in the right direction.

DOE believes that the use of a MOM contractor to manage, operate, and maintain the SPR, under the guidance and oversight of the Operations Office, should provide sound SPR management. To provide adequate oversight, DOE will need to ensure that its control procedures for monitoring the contractor's operations are fully developed and implemented. In this regard, DOE has accepted the contractor's accounting system and has established target dates for implementing other control procedures which should help to ensure effective control and oversight of the MOM contractor. DOE's management plan, which it expects to issue in October 1985, could help avoid a recurrence of the early DOE micromanagement problems if it adequately sets forth, as expected, the responsibilities of DOE operating groups and the MOM contractor.

Based on our November 1983 and February 1984 reports on internal SPR control weaknesses, DOE has taken some positive steps to improve its internal controls over disbursements, receivables, and collections. However, due to staffing limitations and because necessary analyses are still underway, DOE has not been able to fully implement all of (1) the planned enhancements for improving the Accounting Branch's detailed reviews of selected vouchers and for assisting the COTRs to certify claimed costs in connection with the Accounting Branch's planned enhanced system of voucher examinations and (2) the revised procedures to improve collections of accounts receivable and the separation of collection activities from other accounting activities. We believe that DOE must make a firm commitment to ensure that all financial controls are improved to minimize the potential for waste and misuse of federal funds.

The Inspector General's review of the accounts receivable and accounts payable should provide additional insight into the credibility of existing financial controls over these accounts. In addition, if the Inspector General increases its internal reviews through the use of independent public accountants as planned, and the Oak Ridge Operations Office conducts internal reviews at the Project Office as planned, these actions should help to detect deficiencies and provide management an opportunity to improve its controls.

#### AGENCY COMMENTS AND OUR EVALUATION

DOE expressed concern that because of our emphasis on the dollar value of cost-reimbursable contracts at the SPR, our report implied that DOE had not performed well in awarding fixed-price contracts, which result in the lowest risk to the government, in contrast to cost-reimbursable contracts, which place most of the cost and performance risk on the government. We mentioned the large dollar value of DOE's cost-reimbursable contracts to point out the need for DOE to effectively implement procedures for controlling and monitoring this type of contract, not to show how DOE performed in awarding fixed-priced contracts. We recognize that DOE has made extensive use of fixed-price contracts and have revised our report to present a more balanced picture of DOE's use of cost-reimbursable and fixed-price contracts.

## CHAPTER 6

### IMPACTS OF A MORATORIUM AND

#### FUTURE DEVELOPMENTAL STRATEGIES

The decisions on the SPR's size and fill rate that the Congress is facing this year and will likely face in future years depend on the value associated with the immediate need to reduce the budget deficit weighed against the need to pursue the objective of a 750-million-barrel reserve. To assist the Congress, we analyzed the administration's fiscal year 1986 budget, which proposed a 489-million-barrel reserve and five optional size strategies. Our April 22, 1985, report entitled Optional Development Strategies for the Strategic Petroleum Reserve (GAO/RCED-85-113 and GAO/RCED-85-117) showed that:

- Since the administration's fiscal year 1986 budget proposed a reserve of less than 500 million barrels, annual Naval Petroleum Reserve revenues, totaling about \$1 billion, could be lost. This could occur because the Energy Security Act tied a minimum 500-million-barrel SPR, or an average daily fill rate of 100,000 barrels a day, to continued production and sale of NPR oil.
- Incremental costs to develop storage facilities (including distribution enhancements) are relatively small.
- Large budget savings come from decreased oil fill, not from stopping facilities development.
- As the SPR increases in size, so does its potential to meet domestic oil needs, mitigate adverse economic impacts, and satisfy the U.S. commitment to the International Energy Agency for a longer period of time.

Our report and related testimony<sup>1</sup> concluded that serious consideration should be given to continuing to develop storage facilities for 750 million barrels but keeping the oil fill rate flexible. Subsequent to our work, the Congress enacted legislation which did not accept the proposed moratorium and allowed for the continued development of storage facilities and for filling the SPR up to 500 million barrels by the end of fiscal year 1986. This legislation also alleviated the NPR oil problem. Congress is currently considering legislation for fiscal year 1986 that would both provide additional funds to continue development of storage facilities and specify an SPR fill rate using previously appropriated funds. This fill rate could provide for an SPR somewhat larger than 500 million barrels. Our report

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<sup>1</sup>Hearings on the administration's SPR moratorium proposal before the Subcommittee on Environment, Energy and Natural Resources, House Committee on Government Operations, April 1, 1985.

should remain of use to the Congress in its considerations of the fiscal year 1986 SPR fill rate and in its future deliberations on the SPR's size and fill rates.

#### ALTERNATIVE SPR SIZES

We compared the proposed 489-million-barrel SPR with a 500-, 550-, 610-, and 750-million-barrel SPR. We selected the 500-million-barrel size because that amount is needed for the government to continue producing its share of NPR oil. The 550-million-barrel size represents the size DOE had planned at the end of phase II; the 750-million-barrel size is the fully completed SPR; and the 610-million-barrel size is the fully completed SPR with the exception of the Big Hill storage site. In considering the 750-million-barrel SPR, we also assessed the possibility of DOE's continuing to develop facilities for a 750-million-barrel reserve but limiting the amount of oil to 500 million barrels.

#### EFFECT OF MORATORIUM ON NPR REVENUES

The Elk Hills NPR near Bakersfield, California, is the second largest oil-producing field in the United States and the largest in the contiguous 48 states. The Energy Security Act tied NPR production to a minimum SPR size. Section 802 of the act provided, at the time of our report, that no portion of the U.S. share of NPR crude oil may be sold or disposed of except to the SPR during any fiscal year unless the SPR is being filled during that fiscal year at an average of at least 100,000 barrels per day until the quantity of oil in the SPR is at least 500 million barrels. We reported that since a 489-million-barrel reserve is less than 500 million barrels, revenues from the sale of NPR oil would be affected. The government's share of NPR oil over the next 5 years is expected to average about \$1.12 billion per year--a total of about \$5.6 billion. We also reported that the cost to develop storage facilities and increase the oil inventory from 489 million to 500 million barrels would be relatively small--\$318 million--compared with the potential lost revenues.

Subsequent to our April 1985 work, the Congress enacted the Supplemental Appropriations Act for Fiscal Year 1985 (Public Law 99-88, Aug. 15, 1985), which amended the Energy Policy and Conservation Act to allow NPR oil to be sold if the SPR fill rate is sufficient to attain a level of 500 million barrels by the end of the fiscal year regardless of the daily fill rate. It also made available funds for filling the SPR in fiscal year 1986, up to a total of 500 million barrels, by disapproving a portion of the administration's proposed deferral of oil acquisition funds.

#### COSTS OF ALTERNATIVE SPR SIZES

Our testimony and report discussed various costs to develop and fill the SPR at five different levels in addition to the

489-million-barrel SPR. Two of the most significant areas analyzed were storage facility development costs and oil purchase costs.

Our analysis showed that additional storage space can be created and site development can be completed at relatively small incremental costs. For example, storage facilities could be developed at an estimated incremental cost of about \$6 million for a 500-million-barrel SPR. Developing facilities for a 750-million-barrel reserve would cost about \$576 million (including distribution enhancements). Our last option--developing the full 750-million-barrel capacity but limiting fill to 500 million barrels--would also require the maximum facility cost of \$576 million plus an additional \$1 million to reconfigure cavern piping.

Our analysis also showed that in contrast to facility development costs, the incremental oil purchase costs for each option are considerably greater. For example, under the 750-million-barrel option, oil costs would be about \$7.6 billion compared to \$576 million for facilities development. As a result, the large proposed budget savings for a smaller reserve come from decreased oil fill, not stopping facilities development.

On March 15, 1985, we testified<sup>2</sup> on stopping development at Big Hill. We pointed out that by the end of September 1985, DOE will have on-site about \$10 million worth of pipe and well casing and nearly \$20 million worth of new equipment such as pumps, motors, and valves and electrical, electronic, and telecommunications components that will have to be maintained in acceptable condition over an indefinite period.

We stated that:

- The length of time the equipment can be safely stored in a reusable condition is uncertain.
- Within certain constraints, the task of placing the Big Hill site in a standby condition for a future restart is technically feasible. Short- and long-term maintenance is possible under a fully implemented, well-planned program. Adequate storage space could be made available, either on-site or through commercial sources, and the methodology for preserving the integrity of the cavern wells is available if needed.
- Under the administration's proposed indefinite moratorium policy, it is difficult to envision how decisions on storage and maintenance of equipment at Big Hill can be

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<sup>2</sup>Hearings on the Big Hill storage site before the Subcommittee on Environment, Energy and Natural Resources, House Committee on Government Operations, March 15, 1985.

made with assurance that the actions decided on would be cost effective.

### BENEFITS OF A LARGER SPR

We also noted in our testimony and report that completing facility development and oil fill for an SPR larger than 489 million barrels would increase the SPR oil availability and drawdown rates, satisfy the U.S. commitment to the International Energy Agency for a longer period of time, and increase the price-dampening effects on expected oil price increases during a disruption.

#### Oil availability and drawdown rate

With a 489-million-barrel reserve, DOE planned to draw down and distribute SPR oil at a rate of 3 million barrels per day. If the entire 489 million barrels could be withdrawn, the SPR could supply oil for about 163 days. A larger SPR--610 or 750 million barrels, for example--not only provides additional oil in the event of a disruption but also allows DOE to withdraw more barrels per day. For example, a 610-million-barrel SPR allows DOE to release and distribute 3.5 million barrels per day compared to 3 million barrels from a 489-million-barrel reserve; 750 million barrels allows 4.5 million barrels per day compared to 3 million.

#### Offset to import reductions

As a member of the International Energy Agency, the United States is expected to maintain a reserve equal to 90 days of the previous year's net oil imports. Oil in SPR and private inventories can be used to meet this commitment. Using the Energy Information Agency's projected estimates for oil imports from 1986 to 1995, we noted that a 489-million-barrel SPR would satisfy the International Energy Agency commitment through 1986. Larger reserves would extend this period. For example, a 750-million-barrel SPR would meet the commitment through 1994.

#### SPR price-dampening effects

Past oil supply disruptions have resulted in large oil price increases. It is generally accepted that the market would react in a similar fashion to future disruptions. We estimated that, based on the results of a GAO-developed oil price model simulating a disruption scenario, the release of SPR oil during a supply disruption potentially could dampen an anticipated oil price increase by about 30 percent at the 489-million-barrel level. A larger SPR would have a more significant impact on price increases. For example, a 750-million-barrel level could reduce a potential price increase by about 42 percent. The larger price-dampening effect occurs because the bigger reserve allows oil to be drawn down at a rate 50 percent greater than the 489-million-barrel reserve and extends the number of days that SPR oil would be available to offset supply shortages.

## RECENT AND PENDING LEGISLATION

The Supplemental Appropriations Act for Fiscal Year 1985 allowed for filling the SPR up to 500 million barrels by the end of fiscal year 1986 and allowed for the sale of NPR oil. In addition, there is also legislation pending that could provide for filling the SPR beyond 500 million barrels. The House-approved Department of the Interior and Related Agencies Appropriation Bill for Fiscal Year 1986 requires a minimum rate of fill during fiscal year 1986 of 100,000 barrels a day until the SPR is 500 million barrels and 50,000 barrels a day thereafter. This would bring the SPR to about 513 million barrels by the end of fiscal year 1986. The Senate has yet to consider this legislation.

## CONCLUSIONS

Decisions on the size and fill rate of the SPR depend on value associated with the need to reduce the budget deficit measured against the need to pursue the objective of a 750-million-barrel SPR. This deliberation, which surfaced during the fiscal year 1986 budget process, can be expected to recur in future budget considerations.

The large budget savings for an SPR smaller than 750 million barrels come from decreased oil fill, not from stopping facilities development. To complete facilities development for a 750-million-barrel SPR would cost \$576 million, while oil for this size SPR would cost \$7.6 billion. Also, completing facility development and oil fill for a 750-million-barrel SPR, as compared to a 489-million-barrel SPR, would (1) increase the oil availability and drawdown capability, (2) allow the U.S. to meet its International Energy Agency commitment until 1994 rather than 1986, and (3) increase the price-dampening affects of expected oil price increases during a disruption. The benefits of a larger SPR require that serious consideration be given to continuing to develop storage facilities for a 750-million-barrel SPR and keeping oil fill rates flexible and tailoring fill rates to oil availability, price, and relevant budget considerations. The Congress has recently enacted legislation along these lines providing for continued development of storage facilities and for filling the SPR up to 500 million barrels by the end of fiscal year 1986.

## AGENCY COMMENTS AND OUR EVALUATION

DOE made several comments regarding the potential loss of revenues from the sale of NPR oil. Since DOE comments were prepared, the Congress has enacted legislation that alleviates the NPR oil problem. This has been recognized in our report.

DOE also commented that our report was misleading in stating that a 489-million-barrel SPR would satisfy the International Energy Agency commitment only through 1986. DOE stated that based on current import rates a 489-million-barrel SPR does not pose a near-term danger to the United States' ability to meet its



GAO REPORTS AND TESTIMONY ON THE SPRREPORTS

1. Comparison of Strategic Petroleum Reserve Oil Prices and Commercial Oil Prices (GAO/RCED-83-156, Sept. 30, 1983).
2. Internal Control Weaknesses Over Disbursements at the Strategic Petroleum Reserve Project Management Office (B-208196, Nov. 14, 1983).
3. Weaknesses in Internal Controls Over Receipts at the Strategic Petroleum Reserve Project Management Office (B-208196, Feb. 15, 1984).
4. Additional Improvements Needed in Logistics Support for the Strategic Petroleum Reserve (GAO/RCED-84-12, April 13, 1984).
5. Defense Fuel Supply Center Procedures for Purchasing Strategic Petroleum Reserve Oil (GAO/RCED-84-61, Sept. 21, 1984).
6. Optional Development Strategies for the Strategic Petroleum Reserve (GAO/RCED-85-113, April 22, 1985 and GAO/RCED-85-117, April 22, 1985).
7. Analysis of Oil Withdrawal and Distribution Tests for the Strategic Petroleum Reserve (GAO/RCED-85-115, May 18, 1985).
8. Evaluation of the Department of Energy's Plan to Sell Oil from the Strategic Petroleum Reserve (GAO/RCED-85-80, June 5, 1985).
9. More Assurance Is Needed That Strategic Petroleum Reserve Oil Can Be Withdrawn as Designed (GAO/RCED-85-104, Sept. 27, 1985).

QUARTERLY STATUS REPORTS

1. Progress in Filling the Strategic Petroleum Reserve Continues, but Capacity Concerns Remain (GAO/EMD-82-112, July 15, 1982).
2. Status of Strategic Petroleum Reserve Activities as of September 30, 1982 (GAO/RCED-83-29, Oct. 15, 1982).
3. Status of Strategic Petroleum Reserve Activities as of December 31, 1982 (GAO/RCED-83-93, Jan. 14, 1983).
4. Status of Strategic Petroleum Reserve Activities as of March 31, 1983 (GAO/RCED-83-136, Apr. 15, 1983).
5. Status of Strategic Petroleum Reserve Activities as of June 30, 1983 (GAO/RCED-83-203, July 13, 1983).

6. Status of Strategic Petroleum Reserve Activities as of September 30, 1983 (GAO/RCED-84-11, Oct. 14, 1983).
7. Status of Strategic Petroleum Reserve Activities as of December 31, 1983 (GAO/RCED-84-92, Jan. 13, 1984).
8. Status of Strategic Petroleum Reserve Activities as of March 31, 1984 (GAO/RCED-84-148, Apr. 13, 1984).
9. Status of Strategic Petroleum Reserve Activities as of June 30, 1984 (GAO/RCED-84-182, July 13, 1984).
10. Status of Strategic Petroleum Reserve Activities as of Sept. 30, 1984 (GAO/RCED-85-40, Oct. 15, 1984).
11. Status of Strategic Petroleum Reserve Activities as of December 31, 1984 (GAO/RCED-85-58, Jan. 22, 1985).
12. Status of Strategic Petroleum Reserve Activities as of March 31, 1985 (GAO/RCED-85-111, April 15, 1985).
13. Status of Strategic Petroleum Reserve Activities as of June 30, 1985 (GAO/RCED-85-149, June 15, 1985).

GAO TESTIMONY RELATING TO MATTERS  
DISCUSSED IN THIS REPORT

1. Hearings on the management of the SPR before the Subcommittee on Environment, Energy, and Natural Resources, House Committee on Government Operations, May 24, 1983.
2. Hearings on DOE's abilities to draw down and distribute oil from the SPR before the Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, September 24, 1984.
3. Hearings on the Big Hill storage site before the Subcommittee on Environment, Energy, and Natural Resources, House Committee on Government Operations, March 15, 1985.
4. Hearings on the administration's SPR moratorium proposal before the Subcommittee on Environment, Energy and Natural Resources, House Committee on Government Operations, April 1, 1985.

ADVANCE COMMENTS FROM THE  
DEPARTMENT OF ENERGY



**Department of Energy**  
**Washington, D.C. 20585**

AUG 09 1985

Mr. J. Dexter Peach  
Director, Resources, Community  
and Economic Development Division  
U.S. General Accounting Office  
Washington, DC 20548

Dear Mr. Peach:

The Department of Energy (DOE) appreciates the opportunity to review and comment on the General Accounting Office (GAO) draft report entitled "The Strategic Petroleum Reserve: An Overview of Its Development and Use in the Event of an Oil Supply Disruption."

While the GAO draft "Overview" report provides a reasonable summarization of several earlier individual subject-area GAO reports, some portions of the "Overview" report have failed to incorporate changes to reflect prior DOE comments on the various GAO reports. Therefore, a reiteration of certain of DOE's prior comments is provided herein, along with comments on those areas that previously have not been the subject of formal DOE comments.

The report expresses concerns that the Strategic Petroleum Reserve (SPR) cannot achieve the Phase II design drawdown rate and sustain it over an extended drawdown period. DOE believes that there is substantial evidence to support a conclusion that SPR design drawdown rates can be achieved and sustained over an extended period. Since Phase II of the SPR project, which includes reconfiguration of site equipment and caverns for drawdown operations, has not been completed, the ability to demonstrate Phase II design drawdown rates by way of operational tests is currently limited. However, results of computer simulations of SPR operations based on final site system configurations, combined with analyses of site system availabilities, provide substantial analytic evidence of the capability of SPR sites to meet or exceed drawdown performance criteria. In addition, more than five years of successful leaching and fill operations at SPR sites have provided a good indicator of system reliability and availability, and thus an indicator of the SPR's ability to sustain design drawdown rates since much of the same equipment is used in both modes of operation. However, the GAO's use of the leach flow rates as an indicator of expected drawdown flow rate capabilities is not appropriate since there are significant differences in the modes of operation associated with leaching and drawdown.

Mr. J. Dexter Peach

-2-

DOE remains in disagreement with GAO's conclusion regarding cost savings which might have been attained if the Defense Fuel Supply Center (DFSC) had exercised an exception to the established price criteria for SPR oil acquisition, so as to purchase a lesser quality crude oil above the current price range established by DFSC. DFSC's price-range methodology is sensitive to quality differentials, and is in full compliance with Federal and Department of Defense procurement regulations. Moreover, crude oil quality is critical to the ultimate value of the Strategic Petroleum Reserve (SPR), and any amount of lower quality crude oil will lessen the value of the SPR crude in storage, a factor not considered in GAO's computation of purported savings.

A preclusion of any foreign entity from bidding for SPR oil, as suggested by GAO, easily could be circumvented by the establishment of a U.S. shell corporation or the like. Therefore, it likely would be futile to attempt to restrict such sales. In any case, the Standard Sales Provisions permit the Contracting Officer to reject a bidder as non-responsible based on evaluation or a lack of integrity, including evaluation that the bidder has engaged in action inimical to the well-being of the U.S., which diminishes confidence in the bidder's prospective contract performance. The Department also disagrees with GAO's suggestion that participation by brokers and traders may present problems with "public acceptability." GAO recognizes that allowing such parties to participate could add flexibility to, and help facilitate, oil transactions, but GAO omits the important fact that many companies rely on brokers and traders in business-as-usual crude oil transactions.

GAO's emphasis on the dollar value of SPR contracts awarded tends to imply that DOE has not performed well in awarding fixed-price contracts, which result in the lowest risk to the Government. In fact, a high percentage of the dollar amounts involved in prime cost-reimbursable contracts were directly passed on by the prime contractor to subcontractors as fixed-price contracts. For example, approximately 75 percent of the total authorized amount for the initial SPR construction management contractor was committed to fixed-price subcontracts.

The potential loss of revenues from a shut-in of the Naval Petroleum Reserves (NPR) should not be attributed as a cost of the proposed SPR moratorium. The Department has testified that it does not favor a shut-in of the NPR, and that if Congress agrees with the proposed moratorium, the linkage between the SPR fill and NPR production could be remedied in the appropriations process. It is also important to note that the NPR is required to maintain a production rate that would not risk long-term damage to the oil field or reduce the total quantity of oil ultimately recoverable; thus, the GAO estimate of \$2.5 billion in savings is considered to be low.

The GAO's statement and conclusion regarding "Offset to import reductions" (a reference to the maintenance of emergency reserve to fulfill obligations under the International Energy Program (IEP)) is misleading. The proposed moratorium on SPR fill does not pose a near-term danger to the United States' ability to meet its IEP 90-day emergency reserve obligation. A SPR containing 489 million

Mr. J. Dexter Peach

-3-

barrels of oil at the end of fiscal year 1985 will hold the equivalent of over 120 days of net imports at current import rates. Accordingly, DOE can justify the SPR moratorium proposal by the degree of protection currently provided by the SPR and the obvious need to consider Federal budget priorities in the forthcoming fiscal year. The proposal does not preclude a broad range of SPR development and fill strategies in future years as circumstances change.

Finally, GAO's discussion of the impact on SPR distribution of the "Jones Act" requirement to use U.S.-flag tankers for transporting SPR oil between two U.S. ports fails to reflect adequately DOE's view that the limited access to Jones Act vessels may discourage some firms from bidding on SPR oil, because of the severe penalties imposed by the SPR Standard Sales Provisions for an unexcused failure to lift SPR oil on schedule. In our view, the impact of the Jones Act requirement on various firms' ability to compete for SPR oil is an important problem that should be included in GAO's analysis.

Additional technical comments and supporting data were discussed with GAO staff at a meeting at the SPR Project Management Office on July 29, 1985. A summary of these technical comments is being forwarded separately. DOE hopes these comments will be helpful to GAO and considered in the preparation of the final report.

Sincerely,



6 Martha Hesse Dolan  
Assistant Secretary  
Management and Administration

ADVANCE COMMENTS FROM THE  
DEPARTMENT OF DEFENSE



ACQUISITION AND  
LOGISTICS

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301-8000

23 AUG 1985

Mr. Frank C. Conahan  
Director, National Security and  
International Affairs Division  
United States General Accounting Office  
Washington, D.C. 20548


Dear Mr. Conahan:

This is to acknowledge receipt of chapter 3 of the General Accounting Office (GAO) Draft Report, "The Strategic Petroleum Reserve: An Overview of Its Development and Use in the Event of an Oil Supply Disruption," dated July 5, 1985, (GAO Code 001754), OSD Case 6764. The Department of Defense (DoD) generally concurs with the content of the Draft Report. However, the Department has two areas of disagreement that were discussed with GAO upon issuance of previous reports. In addition, a minor modification is recommended to page 17. These are discussed in the enclosure.

Now on p. 15.

DoD appreciates the opportunity to review your reports on the Strategic Petroleum Reserve.

Sincerely,

  
James P. Wade, Jr.

Enclosure

## CHAPTER 3

GAO DRAFT REPORT - DATED JULY 5, 1985  
(GAO CODE NO. 001754) OSD CASE NO. 6764

"THE STRATEGIC PETROLEUM RESERVE: AN OVERVIEW OF ITS DEVELOPMENT  
AND USE IN THE EVENT OF AN OIL SUPPLY DISRUPTION"

FINDINGS TO BE ADDRESSED IN THE DOD RESPONSE TO THE GAO DRAFT  
REPORT

\* \* \* \* \*

GAO discusses, quite accurately and comprehensively, a dispute regarding market pricing concepts on pages 24-26, originally contained in its report entitled "Defense Fuel Supply Center Procedures for Purchasing Strategic Petroleum Reserve Oil" (RCED-84-61). DoD still disagrees with the GAO's recommendation to develop formal guidelines for making exceptions to our market pricing methodology. DoD has found that consideration of such exceptions works adequately on a case-by-case basis. DoD especially disagrees with GAO's original application of such exceptions. This application reduced the importance of the market value differentials between crude oils in favor of the overall lowest cost regardless of quality. DoD would be more inclined to move in the opposite direction and buy the "best value" crude oil offered during the solicitation period.

Now on p. 22. In its report, "Comparison of Strategic Petroleum Reserve Oil Prices and Commercial Oil Prices," (RCED-83-156), GAO does not adequately discuss DoD's reservations about GAO's price estimation methods. On page 26 of chapter 3 of the draft Strategic Petroleum Reserve (SPR) Overview Report, GAO states that it compared Defense Fuel Supply Center (DFSC) prices to "average oil company prices." This is not the case. GAO compared DFSC prices to GAO estimates of spot market prices paid in the private sector at approximately the same time. Prior to the formal issuance of the 1983 report, DoD objected to this method of comparison. Our comments should be noted in chapter 3.

Now on p. 15. Finally, on page 17 of the Draft Report, GAO states that the PEMEX contract has ". . . been advantageous to DOE, as compared with spot market purchases, when both oil and transportation costs are considered." DoD emphasizes that the savings from this contract accrued solely from the lower additional costs for U.S. flag tankers. Throughout the period discussed, Arabian Gulf sour crudes were available in the spot market at prices below the cost of PEMEX crude when considered on a delivered foreign flag basis. The deletion of the words . . . [both oil and]. . . from the above sentence may be sufficient to correct this problem.









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