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REPORT BY THE U.S.

General Accounting Office

Status Of Strategic Petroleum Reserve Activities As Of September 30, 1984

The Department of Energy reported that 70.1 million barrels of oil were delivered to the Strategic Petroleum Reserve during fiscal year 1984, for an average annual fill rate of 192,000 barrels per day. As of September 30, 1984, the Reserve contained 431.1 million barrels.

This report discusses the progress being made in filling, developing, and operating the Reserve. It also discusses other events and activities affecting the Reserve that occurred during the fourth quarter of fiscal year 1984.



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RESOURCES, COMMUNITY,
AND ECONOMIC DEVELOPMENT
DIVISION

B-208196

The Honorable James A. McClure
Chairman, Committee on Energy and
Natural Resources
United States Senate

The Honorable J. Bennett Johnston
Ranking Minority Member, Committee
on Energy and Natural Resources
United States Senate

On March 25, 1982, the Senate Committee on Energy and Natural Resources requested that we report on a quarterly basis, through fiscal year 1985, on the Department of Energy's (DOE's) progress in filling the Strategic Petroleum Reserve (SPR) and in complying with the requirements of applicable law. This is the 10th quarterly report. A list of our prior reports is contained in table 11 in appendix II.

In this report, we discuss events and activities related to the administration's progress in filling, developing, and operating the SPR during the fourth quarter of fiscal year 1984. Specifically, we note that during the quarter:

- The Congress appropriated \$459.2 million in the Supplemental Appropriations Act for Fiscal Year 1984 for SPR facilities development. The Congress also appropriated \$2.05 billion in the Continuing Resolution for Fiscal Year 1985 in order to achieve an oil fill rate of 159,000 barrels per day.
- DOE added 17.4 million barrels of oil during the quarter, bringing the total oil in the SPR to 431.1 million barrels. The oil fill rate averaged 192,000 barrels per day in fiscal year 1984.
- DOE paid about \$898 million for oil acquisition and transportation, had unpaid obligations of about \$542 million, and had about \$15 million in unobligated funds available for additional oil purchases.
- The storage capacity development program proceeded without any major problems, generally achieving DOE goals.

- DOE approved the schedule to implement the pipeline construction and marine terminal modification projects to improve the SPR oil distribution system. However, as of September 30, 1984, the administration had not formally notified the Congress of a proposal to reallocate fiscal year 1985 SPR facilities development funds to cover fiscal year 1985 distribution system expenditures.
- DOE extended for 1 year its contracts for operations and maintenance and for security.
- DOE reduced the corrective maintenance backlog and generally achieved its fiscal year 1984 goal of no more than a 30-day backlog. However, substantial amounts of general maintenance, particularly painting, need to be done.
- DOE continued making progress in implementing the recommendations of two internal reports on the SPR program.

See appendix I for more details and appendix II for supporting tables and figures.

OBJECTIVES, SCOPE, AND METHODOLOGY

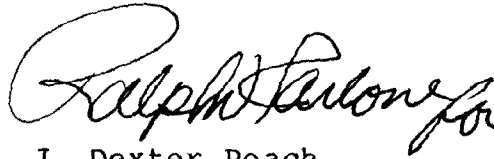
We limited our review, because of the time allowed, to providing primarily statistical information and highlights of major activities that occurred during the period covered. To obtain this information, we reviewed DOE program documents, publications, and studies, and we interviewed DOE managers and operating personnel responsible for planning and managing activities associated with the development and operation of the SPR facilities. We also interviewed employees from both DOE and the Defense Fuel Supply Center, DOE's purchasing agent for most of the SPR oil.

Our review was performed in accordance with generally accepted government auditing standards, except that we did not verify the volumes or quality of oil that DOE received nor the available capacity of SPR storage facilities. We did not do this because the effort that would be required was beyond the scope of work for this report.

We did not obtain official agency comments because of the required time frame for issuing this report. However, we provided DOE and Defense Fuel Supply Center program officials with a draft of this report, discussed its factual accuracy with them, and made appropriate revisions.

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As arranged with your office, we plan no further distribution of this report until 7 days after the issue date, unless you publicly announce its contents earlier. At that time, we will provide copies to the Secretary of Energy and other interested parties and make copies available to the public upon request.



J. Dexter Peach
Director

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ABBREVIATIONS

DCAA	Defense Contract Audit Agency
DFSC	Defense Fuel Supply Center
DOE	Department of Energy
GAO	General Accounting Office
PEMEX	Petroleos Mejianos
POSSI	Petroleum Operations and Support Services, Inc.
SPR	Strategic Petroleum Reserve

STATUS OF STRATEGIC PETROLEUMRESERVE ACTIVITIES AS OF SEPTEMBER 30, 1984

The Energy Policy and Conservation Act (Public Law 94-163, Dec. 22, 1975) authorized the creation of a Strategic Petroleum Reserve (SPR) to store up to one billion barrels of oil. To meet the act's goals, the Department of Energy (DOE) is implementing a three-phase plan to store 750 million barrels of oil. 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 is scheduled for completion in 1987. It involves creating new caverns through a leaching program at three of the phase I sites to increase SPR capacity to about 550 million barrels. The leaching program entails pumping fresh water into salt deposits and removing the resultant brine. DOE injects oil into the top of the cavern as the leaching process creates the storage capacity. Phase III, which is scheduled for completion in 1990, will create additional capacity to reach the 750 million barrel goal by expanding three existing storage sites and developing a new site at Big Hill, Texas. Because of the time needed to develop capacity, activities associated with phases II and III overlap.

The SPR storage sites are connected by pipeline to three marine terminals for oil fill and for oil drawdown and distribution during an oil supply disruption:

- Seaway complex: The Bryan Mound storage site is connected to Phillips Petroleum Co.'s terminal (formerly, the Seaway terminal) in Freeport, Texas.
- Texoma complex: The West Hackberry and Sulphur Mines storage sites are connected and the Big Hill storage site will be connected to Sun Oil Co.'s terminal in Nederland, Texas.
- Capline complex: The Weeks Island and Bayou Choctaw storage sites are connected to DOE's St. James terminal.

In June 1983, DOE reorganized the SPR project management structure. Responsibility for project direction was transferred from the Project Management Office (Project Office) in New Orleans, Louisiana, to the Oak Ridge Operations Office (Operations Office) in Oak Ridge, Tennessee. The SPR Program Office in Washington, D.C., retained responsibility for overall program management and planning.

This report discusses activities during the quarter ending September 30, 1984, that affect the SPR, including (1) fiscal year 1985 SPR appropriations and other congressional action, (2) the activities associated with adding 17.4 million barrels of oil to the SPR during the quarter, (3) the status of the SPR oil acquisition and transportation account, (4) the cavern leaching

program at the SPR storage sites, (5) activities related to DOE's proposed SPR oil distribution system improvements, (6) the extension of two SPR contracts, (7) efforts to reduce the SPR maintenance backlog, and (8) implementation of recommendations that two Operations Office reports made on the SPR program. Appendix II presents supporting tables and figures.

SPR APPROPRIATIONS AND OTHER CONGRESSIONAL ACTION

On August 22, 1984, the second Supplemental Appropriations Act for Fiscal Year 1984 (Public Law 98-396) was enacted. The act provides \$459.2 million to remain available until expended for SPR facilities development, planning, and program direction. The committee reports supporting the act cited the need to develop additional permanent storage capacity, in particular at the new Big Hill storage site, as quickly as possible.

The Congress did not pass the Department of the Interior and Related Agencies Appropriation 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, which appropriated \$2.05 billion in order to achieve an SPR oil fill rate of 159,000 barrels per day in fiscal year 1985. If the SPR is filled at this rate, it will contain 489 million barrels of oil at the end of the fiscal year. (See fig. 1 and table 1 on pp. 12-13 for a comparison of SPR oil inventories by fiscal year for alternative oil fill rates.)

On September 18, 1984, the House of Representatives passed the proposed SPR Reliability Improvement Act (H.R. 3880). The bill would require DOE to conduct a drawdown and distribution test of about 1.1 million barrels of SPR oil within 6 months of the date of enactment. The bill stipulates that the SPR oil sale price cannot be less than 90 percent of the sales price, as estimated by DOE, of comparable oil being sold in the U.S. Gulf Coast at the time of the test. The Senate did not act on the bill before it adjourned. In addition to SPR drawdown and distribution test legislation, the next Congress is expected to consider the renewal of Title I, Part B, of the Energy Policy and Conservation Act, which authorized the establishment of the SPR and which expires on June 30, 1985.

SPR OIL FILL

DOE reported that 17.4 million barrels of oil were added to the SPR during the quarter ending September 30, 1984, bringing the total SPR inventory to 431.1 million barrels as of September 30, 1984. The average SPR oil fill rate for fiscal year 1984 was 192,000 barrels per day. (See fig. 2 and tables 2 through 5 on pp. 14-18 for further information on the SPR oil acquisition and fill activities.) About 18.2 million barrels, or 26 percent, of the oil delivered in fiscal year 1984 came from the 1981 contract with Petroleos Mexicanos (PEMEX), the Mexican national oil company. About 51.9 million barrels, or 74 percent, came from contracts awarded by the Defense Fuel Supply Center (DFSC) through

long-term contracts or the open, continuous solicitation.¹ Of the oil delivered in fiscal year 1984, about 0.9 million barrels, or 1 percent, was Maya oil that was part of the PEMEX contract oil deliveries; about 31.2 million barrels, or 45 percent, was sour crude, and about 38.0 million barrels or 54 percent, was sweet crude.²

Of the 431.1 million barrels of oil in storage as of September 30, 1984, 49 percent was sour crude, 37 percent was sweet crude, and 14 percent was a combination of lower quality crude oils.

During the quarter, DOE and PEMEX officials agreed to modify the PEMEX I contract, which extends from 1981 to 1986 and which will supply about 18.3 million barrels of oil during fiscal year 1985. Also during the quarter, DFSC awarded 10 contracts through its purchases on the crude oil spot market.

PEMEX contract

In September 1984, Project Office officials reached agreement with PEMEX officials to make modifications to the PEMEX I contract. First, retroactive to April 1, 1984, Maya crude oil was eliminated from the contract. Second, to resolve measurement variances between the number of barrels loaded at the port of origin and the number of barrels discharged at the port of destination, procedures were modified, effective October 1, 1984, to consider a tanker's oil loss experience on previous voyages. Third, procedures also were changed for determining responsibility for paying demurrage charges for the delay of SPR-chartered tankers.

Project Office and PEMEX officials resolved oil quantity and quality variances and demurrage charges that occurred between January 1983 and September 1983 for both the PEMEX I and II contracts. PEMEX credited DOE's PEMEX I account for \$649,000. Project Office and PEMEX officials have not resolved charges that occurred during fiscal year 1984.

¹The open, continuous solicitation is a mechanism DFSC--the purchasing agent for most of the SPR oil--uses to purchase SPR oil. It involves the use of a purchasing solicitation which is not reissued but rather remains open, allowing offers of oil to be made about every 2 weeks. The offers usually involve oil that is available on the "spot," or short-term, market.

²DOE established quality specifications for SPR oil which include a maximum of 3.5 percent sulfur content for Maya crude, a range from 0.5 percent to 1.99 percent sulfur for sour crudes, and a maximum of 0.5 percent sulfur for sweet crudes.

DFSC spot market purchases

During the quarter, DFSC awarded 10 contracts, totaling about 8.7 million barrels, through the open, continuous solicitation. DFSC officials stated that DOE worked with DFSC during the quarter to take advantage of lower spot market prices for prompt deliveries. DOE did not have SPR storage capacity available for these prompt cargoes, but arranged for surge storage capacity at the Sun Oil Co.'s marine terminal. In mid-August, DFSC awarded an offer for the prompt delivery of one million barrels of Forties oil, a British North Sea crude. DFSC estimated that this offer would be about \$0.40 per barrel less (including the cost of temporary storage for 15 days) than the high of its spot market price range for Forties oil delivered to meet DOE's normal requirement period.³ DFSC officials noted that crude oil spot market prices were soft during the quarter, but they expected spot prices to rise during the next quarter as oil companies build up heating oil stocks for the winter season.

SPR OIL ACQUISITION AND TRANSPORTATION FUNDS

During the quarter, DOE made payments of about \$898 million for oil acquisition and transportation.⁴ DOE estimated the unpaid obligations as of September 30, 1984, to be about \$542 million. DOE had about \$15 million available as unobligated funds as of September 30, 1984. (See table 6 on p. 19.)

STORAGE CAPACITY DEVELOPMENT

During the quarter, the phase II storage capacity leaching program proceeded without any major problems, generally achieving DOE goals for capacity development. (See tables 7 and 8 on pp. 20 and 21.) At Bryan Mound, an onsite brine pipeline serving the phase III caverns and some of the phase II caverns developed a leak but caused no delay or shutdown in the leaching program. The West Hackberry storage site was shut down for 2 weeks of scheduled maintenance from September 16 to 29. At Bayou Choctaw, DOE extended the leaching schedule for the phase II cavern until October 1984 to assure compliance with its cavern exchange agreement with Allied Chemical Corp. Project Office officials stated that the cavern exchange could occur sooner than they had anticipated, allowing oil fill to begin in fiscal year 1986.

³DFSC used a market price analysis to establish a range of fair spot market prices for each crude oil type that is offered. DFSC's policy is to pay no more than the high of its spot market price range. DFSC's oil acquisition procedures were evaluated in our report, Defense Fuel Supply Center Procedures for Purchasing Strategic Petroleum Reserve Oil (GAO/RCED-84-61, Sept. 21, 1984).

⁴This includes \$174 million that DOE had reported as paid last quarter, but which actually was not paid until the beginning of this quarter.

Bryan Mound

The Bryan Mound leaching program operated without major problems during the quarter. The brine disposal rate averaged 878,000 barrels per day as compared with the baseline brine disposal rate of 900,000 barrels per day. During fiscal year 1984, the leaching program created about 32.6 million barrels of permanent oil storage capacity.

In our March 1984 quarterly report,⁵ we discussed the rupture of one of the two major onsite brine pipelines. In response to the incident, DOE instituted an ultra-sonic testing program to monitor the condition of the site's brine pipelines. In July 1984, a leak occurred in the other major brine pipeline which serves the four phase III caverns and some of the phase II caverns. The break was about 10 feet from the ultra-sonic monitoring point that DOE had identified as most serious because 50 percent of the pipeline wall had corroded. The brine pipeline was clamped around the break, and the leaching program experienced no delay or shutdown. DOE plans to replace the broken section of the brine pipeline in October 1984 with an above-ground parallel pipe. No shut down of operations will be needed for this work.

On July 14, 1984, DOE began leaching the last of the four phase III caverns. The phase II leaching program continues to wind down. Of the 12 phase II caverns, 6 are filled, 3 are in the final fill stage, and 3 are in the leach/fill stage.

The Bryan Mound site will be shut down for 2 weeks in October 1984 for scheduled maintenance. This will include calibration of pressure relief valves, extensive preventive maintenance on electrical switching gear, replacement of cavern main-line valves, and replacement of the suction and discharge pipes for the site's pumps.

West Hackberry

The West Hackberry leaching program operated without major problems during the quarter. The brine disposal rate averaged 721,000 barrels per day as compared with the baseline brine disposal rate of 900,000 barrels per day. During fiscal year 1984, the leaching program created about 40.9 million barrels of permanent oil storage capacity.

From September 16 to 29, the site was shut down for scheduled maintenance. This included replacement of valves, preventive maintenance for electrical switching gear, and calibration of pressure relief valves. In addition, DOE plans to begin an ultra-sonic testing program of the site's 10 water intake and brine disposal pipelines in October 1984. Pipeline points designated for testing are being excavated, and the ultra-sonic testing work package is out for bid.

⁵Status of Strategic Petroleum Reserve Activities as of March 31, 1984 (GAO/RCED-84-148, Apr. 13, 1984).

In our last quarterly report,⁶ we discussed electrical switching equipment malfunctions at West Hackberry that shut down the cavern leaching program for about 23 days. In August 1984, DOE circulated a preliminary draft report of the accident investigation. The draft stated that the accident was apparently caused by a computer software error; inadequate electrical circuit design, quality assurance, and testing; and inadequate preventive maintenance.

In July 1984, DOE lowered the well casing of a phase I cavern by 40 feet to create 300,000 barrels of additional capacity. Of the 16 phase II caverns, 4 are full, 1 is in the final fill stage, 4 are in the leach/fill stage, and 7 are in the leaching only stage. On August 7, 1984, DOE awarded a contract to Eltek, Inc., for site preparation of the only West Hackberry phase III cavern.

Bayou Choctaw

During the quarter, DOE decided to increase the gross cavern capacity of its phase II cavern from 5.6 million barrels to 6.1 million barrels. This was done in order to ensure compliance with the exchange agreement which requires DOE to provide 4.5 million barrels of usable capacity. The cavern will be exchanged for a 10 million barrel cavern, owned by Allied Chemical Corp, that currently contains ethane. DOE Project Office officials stated that the ethane transfer between the two caverns will take less time than originally anticipated. As a result, the officials said that the exchange date may be moved forward, allowing oil fill to begin in fiscal year 1986. On September 28, 1984, the Project Office awarded a contract to Drillco, Inc., for drilling wells for the phase III cavern.

In August 1984, H&G Inspection Co., Inc., conducted ultrasonic tests to gauge wall thicknesses of 10 site pipelines. H&G made 4,905 readings and found that none of the pipelines had losses in excess of one-eighth of an inch, the maximum corrosion allowance. The Project Office plans to test the pipelines again in about 6 months.

SPR OIL DISTRIBUTION

In our last quarterly report, we discussed DOE's proposed pipeline construction and marine terminal modification projects to respond to SPR oil distribution system constraints that would result from the announced sales of the Seaway and Texoma interstate crude oil pipelines. These SPR distribution projects, which are estimated to cost \$84 million (in 1984 dollars), are as follows:

⁶Status of Strategic Petroleum Reserve Activities as of June 30, 1984 (GAO/RCED-84-182, July 13, 1984).

- Construction of an approximately 50-mile pipeline connecting the Byran Mound storage site to refineries and a marine terminal in the Texas City/Houston, Texas, area and connection of the Bryan Mound site to a second marine terminal in the Freeport, Texas, area.
- Three piping and manifolding modifications to the Sun Oil Co. marine terminal at Nederland, Texas, and construction of a 4-mile pipeline to connect the Big Hill storage site to another marine terminal in the Nederland/Beaumont area.
- Construction of a 9-mile pipeline from the West Hackberry storage site to two Lake Charles, Louisiana, refineries and marine terminals.

The distribution projects would connect SPR facilities to two Gulf Coast refining centers and four additional marine terminals. DOE stated that the projects would increase the oil distribution capability to 4 million barrels per day, as compared with 2.4 million barrels per day if nothing was done to improve the distribution system. (DOE currently is assessing changes to the SPR Capline complex's distribution system that could increase the SPR's distribution capability to the originally planned 1.07 million barrels per day rate for that complex.)

As discussed in our last quarterly report, the Program Office issued two management directives to the Operations Office to proceed with environmental planning, engineering design, and land acquisition activities associated with the SPR's Seaway complex and Texoma complex projects. On August 27, 1984, the Project Office approved the schedule to implement the pipeline construction and marine terminal modification projects for the Seaway complex by December 31, 1986, and the Texoma complex by September 30, 1987. Activities for the Seaway complex and Texoma complex projects were divided into developing environmental assessments in accordance with the National Environmental Protection Act, developing engineering designs and obtaining permits, pipeline construction, and marine terminal modifications. The Project Office has begun a title search to identify owners of land that the proposed pipelines would cross.

On July 12, 1984, the Program Office issued its third management directive to the Operations Office to take the necessary preliminary actions for negotiating contracts with the marine terminals with which DOE proposes to connect SPR storage facilities. The Program Office identified 13 subjects that the contracts should cover, including operational capability specifications, standby services and operational readiness, deballasting and bilge waste requirements, and SPR drawdown exercise participation. The directive stated that, to the maximum extent practicable, efforts should be made to conclude agreements with the marine terminal operators before beginning pipeline construction activities to the terminal.

Our last quarterly report noted that DOE planned to fund distribution system activities during fiscal year 1984 from \$2.8 million of phase III architecture and engineering funds. This allowed some of the work that requires a long lead time to begin. However, before DOE obligates more funds, it plans to formally notify congressional oversight and appropriations committees. In July 1984, DOE submitted its distribution projects proposal, including funding requirements, to the Office of Management and Budget. However, as of September 30, 1984, DOE had not been authorized to reallocate fiscal year 1985 SPR facilities development funds to cover fiscal year 1985 distribution system expenditures.

On September 6, 1984, Seaway Pipeline, Inc., sold its Freeport marine terminal and associated tank farm to Phillips Petroleum Co. Phillips plans to continue to use the marine terminal for crude oil deliveries. This includes SPR deliveries through 1986. The closing date for the sale of the Texoma pipeline to Houston Natural Gas Corp. has been delayed from the original date in July until November 1984. On October 11, 1984, the pipeline was completely filled with water in preparation for its conversion to transit natural gas.

SPR CONTRACTS

In August 1984, the Project Office extended for 1 year its contract with Petroleum Operations and Support Services, Inc. (POSSI), which is responsible for SPR operations and maintenance. Also in August 1984, the Defense Contract Audit Agency (DCAA)⁷ stated in a report on POSSI's cost accounting system that, in its opinion, the accounting system should not be approved. POSSI is reviewing its policies and procedures and plans to resolve the accounting system deficiencies by November 2, 1984.

In September 1984, the Project Office extended its contract with Wells Fargo Guard Services, which is responsible for SPR security. On September 30, 1984, the Project Office's contract with Jacobs D'Appolonia Engineers expired. The Project Office hired Systematic Management Services, Inc., to perform many management support functions that had been done by OAO Corporation.

POSSI contract

On August 30, 1984, the Project Office notified POSSI that it would exercise an option to extend POSSI's contract for 1 year from October 1, 1984, through September 30, 1985, at an estimated cost of \$53 million. This extension is in accordance with the original contract terms, which provided for two 1-year extensions. However, the Project Office letter stated that DOE is presently in the process of selecting a management, operations, and maintenance contractor (DOE closed its request for proposals

⁷DCAA is responsible for reviewing and approving SPR contractors' accounting systems and for auditing their incurred costs.

on July 18, 1984) and that DOE expects the new contractor to assume POSSI's operations and maintenance responsibilities on April 1, 1985. The Project Office letter noted that DOE had attempted to reach an agreement with POSSI to modify the extension so that the POSSI contract termination would coincide with the assumption of responsibility by the new contractor. It stated that, if an agreement could not be reached, DOE may exercise the contract clause to terminate the contract for convenience at an appropriate time before the 1-year termination date.

When POSSI assumed SPR operations and maintenance responsibilities in December 1981, it did not have an approved cost accounting system. In our June 1983 quarterly report,⁸ we discussed a June 1983 DCAA report that criticized POSSI's accounting system. Because of the inadequacies that it identified, DCAA recommended that DOE suspend approval of POSSI's accounting system and letter of credit financing arrangements.⁹ DOE subsequently withdrew its approval of POSSI's accounting system and the use of the letter of credit.

In January 1984, DCAA reviewed POSSI's proposed revised accounting system and recommended that it be implemented. However, on August 2, 1984, DCAA reported to the Project Office that POSSI's implemented accounting system had nine deficiencies. In DCAA's opinion, the accounting system did not provide adequate assurance that only reasonable, allowable, and allocable costs were claimed for reimbursement under government cost-type contracts. DCAA stated that, in its opinion, the Project Office contracting officer should not approve POSSI's accounting system at that time.

POSSI disagreed with DCAA's conclusion that its internal accounting control system did not adequately protect the government's interest. However, POSSI is reviewing its policies and procedures to assure that all of DCAA's perceived concerns are appropriately addressed. According to DCAA personnel, POSSI has set a goal to resolve the accounting system deficiencies by November 2, 1984. As of September 30, 1984, the termination date of POSSI's original contract, DCAA had never approved POSSI's accounting system.

Other SPR contractor changes

The Project Office exercised the contract option to extend Wells Fargo Guard Services for 1 year until September 30, 1985. The contract specified the cost of the extension to be \$4 million.

⁸Status of Strategic Petroleum Reserve Activities as of June 30, 1983 (GAO/RCED-83-203, July 13, 1983).

⁹Under the letter of credit, POSSI could pay its contract expenses from a government-financed account and provide supporting documentation at a later date.

The Project Office also revised the contract's statement of work to include security at Big Hill, additional training for all personnel, and special equipment for the special response team. The Project Office is negotiating with Wells Fargo over the additional cost. It estimates that the additional work will cost about \$3 million.

In September 1984, the Project Office awarded a contract to Systematic Management Services, Inc., for most of the management support services activities that had been performed by OAO Corp. Systematic Management Services was hired under Section 8(a) of the Small Business Administration Act, which encourages the development of small businesses owned by eligible socially or economically disadvantaged persons. Systematic Management Services began phase-in activities on September 18, 1984.

On September 30, 1984, the Project Office's contract with Jacobs D'Appolonia expired. Walk, Haydel and Associates will assume responsibility for the architecture and engineering work associated with SPR site modification and upgrade construction. (Walk Haydel currently is responsible for architecture and engineering work for the Big Hill site.)

FACILITIES MAINTENANCE

In our last quarterly report, we discussed efforts by the Project Office and POSSI to identify and reduce the maintenance backlog for each of the six craft maintenance groups at the SPR facilities. Table 9 on page 22 shows the preventive, corrective, and general maintenance workload at each facility as of August 31, 1984, for each craft group. Overall, the Project Office employed 148 people for maintenance work. (Different types of maintenance are performed by the same personnel in specific craft groups at each site.) Only eight employees were assigned to painting, which is primarily a general maintenance activity. As a result, several sites had major painting backlogs--more than 1 year at the St. James terminal, West Hackberry, and Weeks Island. POSSI is currently in the process of subcontracting out painting work at Weeks Island to reduce some of the backlog.

Table 10 on page 23 shows the corrective maintenance backlog by craft group for all sites between March 1984 and August 1984. The Project Office objective for fiscal year 1984 was to reduce the corrective maintenance backlog to no more than 30 days. Overall, the workload for each craft group has been reduced, in part, because the number of maintenance employees has increased from 122 to 148.

IMPLEMENTATION OF OPERATIONS OFFICE RECOMMENDATIONS

In October 1983, the Operations Office issued its baseline assessment report on the Project Office. This report made 170

recommendations, which the Project Office is currently implementing. As of September 30, 1984, DOE reported that the Project Office had completed closeout documentation for 114 recommendations and still was working to implement the remaining 56 recommendations. The Operations Office had approved the closeout of 64 recommendations. According to the Operations Office implementation plan, 152 recommendations were scheduled for completion by September 30, 1984.

In March 1984, the Operations Office issued its report on allegations of mismanagement or misconduct regarding the SPR program. The report made 25 recommendations, which the Project Office is currently implementing. As of September 30, 1984, the Project Office had completed closeout documentation for eight recommendations and the Operations Office had approved the closeout of one recommendation. According to the Operations Office implementation plan, 15 recommendations were scheduled for completion by September 30, 1984.

FIGURES AND TABLES ON THE STATUS OF
THE STRATEGIC PETROLEUM RESERVE

FIGURE 1: COMPARISON OF FILL RATES IN REACHING 750 MILLION BARRELS

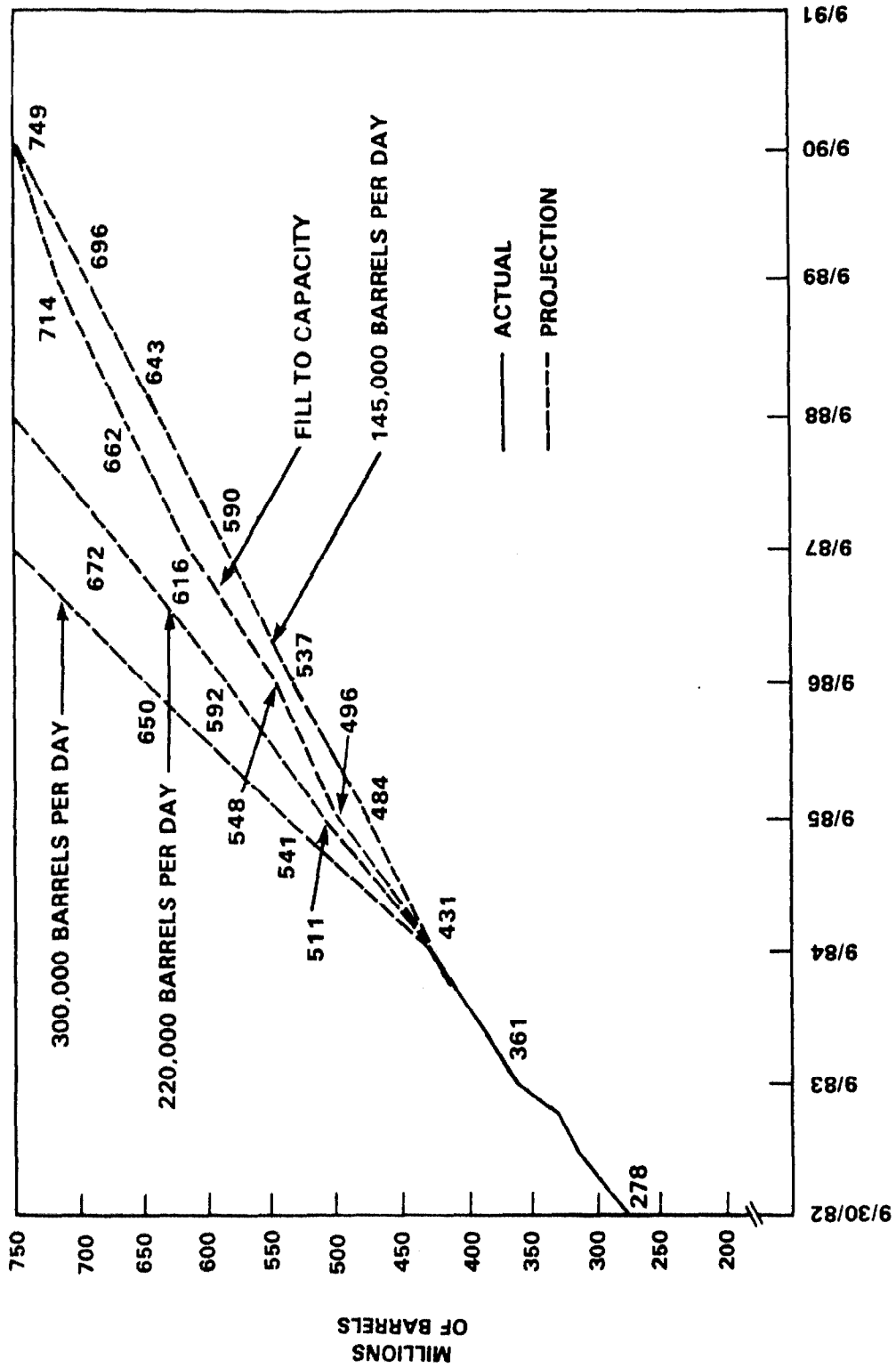


Table 1
Comparison of Fill Rates and
Storage Requirements in Reaching 750 Million Barrels

<u>Fiscal year</u>	<u>Fill to available storage capacity^a</u>	<u>300,000 barrels per day^b</u>		<u>220,000 barrels per day^b</u>		<u>145,000 barrels per day^c</u>		
		<u>Oil volume</u>	<u>Storage requirements^d</u>	<u>Oil volume</u>	<u>Storage requirements^d</u>	<u>Oil volume</u>	<u>Storage requirements^d</u>	
		----- (millions of barrels) -----						
1985	496	541	-45	511	-15	484	+12	
1986	548	650	-102	592	-44	537	+11	
1987	616	750	-134	672	-56	590	+26	
1988	662	-	-88	750	-88	643	+19	
1989	714	-	-36	-	-36	696	+18	
1990	750	-	-	-	-	749	+1	
1991	-	-	-	-	-	750	-	

^aThe available storage capacity is the amount that the administration's fiscal year 1985 budget shows will be available at the end of each fiscal year.

^bThe Energy Emergency Preparedness Act (P.L. 97-229) requires a minimum average annual fill rate of 300,000 barrels per day until at least 500 million barrels of oil are stored. The act also allows a lower rate if the President finds the 300,000 barrels per day rate is not in the national interest. With the presidential finding, the act requires a minimum rate of at least 220,000 barrels per day, or the highest practicable fill rate achievable with available funds. After 500 million barrels of oil are in storage, the act requires the President to seek to fill the SPR at the minimum average rate of 300,000 barrels per day, until at least 750 million barrels of oil are in storage.

^cThe administration's fiscal year 1985 budget proposes to fill the SPR at the 145,000 barrels per day rate until the SPR is filled in early fiscal year 1991.

^dA positive amount indicates excess capacity available while a negative number indicates that additional storage is needed.

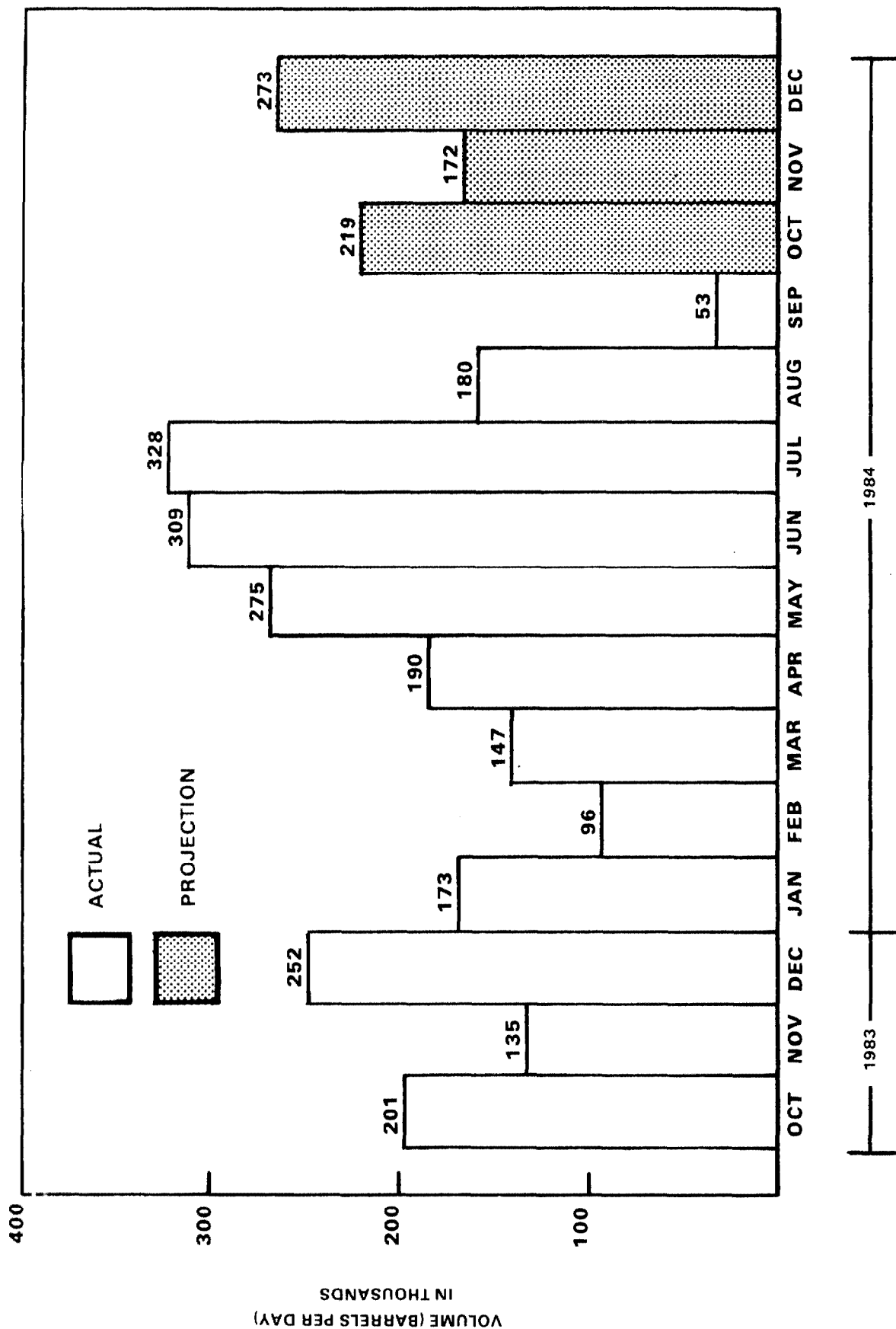
Source: DOE and GAO calculations.

Table 2
SPR Oil Deliveries
by Fiscal Year 1984 Quarter

<u>Quarter</u>	<u>Oil volume</u> <u>at start</u>	<u>Deliveries</u>	<u>Oil volume</u> <u>at end</u>	<u>Average receiving rate</u>	
	<u>of quarter</u>		<u>of quarter</u>	<u>For</u> <u>quarter</u>	<u>Since</u> <u>10/01/83</u>
	----- <u>(millions of barrels)</u> -----			(thousands of barrels per day)	
Oct. 1, 1983 through Dec. 31, 1983	361.0	18.1	379.1	196.7	196.7
Jan. 1, 1984 through March 31, 1984	379.1	12.7	391.8	139.6	168.3
April 1, 1984 through June 30, 1984	391.8	21.9	413.7	241.1	192.5
July 1, 1984 through Sept. 30, 1984	413.7	17.4	431.1	189.1	191.5

Source: DOE.

FIGURE 2: AVERAGE DAILY SPR OIL RECEIVING RATE ^a



^a DAILY RECEIVING RATES FOR OCTOBER, NOVEMBER, AND DECEMBER 1984, ARE BASED ON DOE PROJECTIONS OF FUTURE DELIVERIES AND ARE SUBJECT TO CHANGE.

Table 3

SPR Oil Deliveries by Crude
Type as of September 30, 1984

	<u>Type I^a</u>	<u>Types II-V^b</u>	<u>Type VI^c</u>	<u>Type VIa^d</u>	<u>Maya^e</u>	<u>Total</u>
	------(millions of barrels)-----					
Volume delivered	210.2	161.3	31.4	16.6	11.6	431.1
	------(percent)-----					
Percentage of total oil delivered	49	37	7	4	3	100

^aHigh-sulfur crude (from 0.5 to 1.99-percent sulfur content) with an API gravity range of 30 to 36 degrees. Type I oil includes Arabian Light and Isthmus crudes.

^bHigh-quality crudes with a low sulfur content (maximum 0.5-percent sulfur content) and an API gravity range of 30 to 45 degrees. These types include some North Sea and West African crudes.

^cType VI was established for Alaskan North Slope crude, an intermediate-sulfur crude (maximum 1.25-percent sulfur content) with an API gravity range of 26 to 30 degrees.

^dType VIa was established for the Maya/Isthmus blend under the PEMEX contract. The blend is a high-sulfur mixture with an API gravity of at least 28 degrees.

^eMaya crude is a lower quality oil which has a maximum sulfur content of 3.5 percent and an API gravity of at least 22 degrees. As of April 1984, Maya crude was no longer acquired as part of the PEMEX contract.

Source: DOE.

Table 4

Summary of Oil Acquisition Activities
for Fiscal Year 1984

	Oil deliveries for quarter ending 9/30/84	Oil delivery for FY 1984
	----(millions of barrels)---	
Open, continuous solicitation ^a	13.9	47.5
PEMEX contract	3.5	18.2
Term contracts		
Shell International Trading Co.	-	2.5
BP Oil International Ltd.	-	<u>1.9</u>
Total	<u>17.4</u>	<u>70.1^b</u>

^aThe open, continuous solicitation involves making contract awards without reissuing the solicitation for offers of oil that is available on the "spot," or short-term, market. (See table 5 for individual contract awards.)

^bThis is equivalent to an average annual fill rate of 192,000 barrels per day in fiscal year 1984.

Source: DOE.

Table 5Open, Continuous Solicitation Awards for
Quarter Ending September 30, 1984

<u>Contract date</u>	<u>Supplier</u>	<u>Oil type^a</u>	<u>Total barrels</u> (millions)
8/22/84	T.W. Oil, Inc.	Sour	.65
8/22/84	BP Oil Development, Ltd.	Sweet	1.00
8/22/84	BP Petroleum Development, Ltd.	Sweet	.50
8/23/84	Voest Alpine Trading USA Corp.	Sweet	1.00
9/06/84	BP Oil Development, Ltd.	Sweet	1.00
9/20/84	Phibro Energy, Inc.	Sour	1.90
9/20/84	BP Petroleum Development, Ltd.	Sweet	.50
9/20/84	BP Oil Development, Ltd.	Sweet	1.00
9/20/84	Sohio Supply Co.	Sweet	.55
9/20/84	T.W. Oil, Inc.	Sour	<u>.55</u>
	Total		<u>8.65</u>

^aDOE established quality specifications for SPR oil, including a range from 0.5 percent to 1.99 percent sulfur content for sour crudes and a maximum of 0.5 percent sulfur content for sweet crudes.

Source: DFSC.

Table 6Status of SPR Oil Acquisition and Transportation Funds
as of September 30, 1984^a

<u>Funds made available</u>	<u>Amount</u>
	(millions)
Carryover from fiscal year 1981	\$1,806
Fiscal year 1982 appropriations	3,684
Fiscal year 1983 appropriations	2,074
Fiscal year 1984 appropriations	<u>650</u>
Total made available	<u>\$8,214</u>
<u>Funds used or committed</u>	
Fiscal year 1982 payments	\$3,687
Fiscal year 1983 payments	1,641
Estimated fiscal year 1984 payments ^b	2,329
Estimated DOE unpaid obligations as of 9/30/84 ^c	<u>542</u>
Total used or committed	<u>\$8,199</u>
Estimated unobligated funds at DOE	<u>\$ 15</u>

^aThe Omnibus Budget Reconciliation Act of 1981 (Public Law 97-35, Aug. 13, 1981) established the SPR Petroleum Account, effective October 1981, to pay for petroleum acquisition and transportation. This is an off-budget account.

^bAmount consists of DOE's actual reported payments through August 1984 and DOE's estimated payments for September 1984.

^cUnpaid obligations represent funds that have been committed to pay for fiscal year 1984 oil deliveries under the first PEMEX contract, or are obligated to DFSC for upcoming oil deliveries or purchases, and expected transportation costs. DFSC estimates that of the funds obligated to it, about \$12 million was available as of September 30, 1984, for future purchases.

Source: DOE and DFSC.

Table 7Status of SPR Underground Capacity
as of September 30, 1984

<u>Storage facilities</u>	<u>Capacity available</u>	<u>Capacity filled</u>
Phase I sites: (permanent capacity)	----(millions of barrels)----	
Bayou Choctaw	46.4	45.7
Bryan Mound	67.1	64.4
Sulphur Mines	26.4	26.1
Weeks Island	73.0	73.0
West Hackberry	<u>49.1</u>	<u>49.0</u>
Total	<u>262.0</u>	<u>258.2</u>
Phase II sites: (planned capacity)		
Bayou Choctaw	10.0	(a)
Bryan Mound	120.0	104.9
West Hackberry	<u>160.0</u>	<u>65.2</u>
Total	<u>290.0</u>	<u>170.1</u>
Tanks and pipelines	<u>-</u>	<u>2.8</u>
Total for SPR	<u><u>552.0</u></u>	<u><u>431.1</u></u>

^aA newly leached cavern with 4.5 million barrels of usable capacity will be exchanged for an existing 10-million-barrel cavern owned by Allied Chemical Corporation at the Bayou Choctaw site after leaching is completed. DOE currently expects to complete leaching in September 1984.

Source: DOE.

Table 8

Summary of Leaching Activities for
the Quarter Ending September 30, 1984^a

	<u>Brine disposal</u>		<u>Cumulative oil capacity^b</u>		<u>Cumulative oil fill</u>	
	<u>Baseline</u>	<u>Actual</u>	<u>Baseline</u>	<u>Actual</u>	<u>Baseline</u>	<u>Actual</u>
	(thousands of barrels per day)		------(millions of barrels)-----			
Bryan Mound:						
July	900	921	92.5	93.1	95.7	98.6
August	900	937	96.5	99.5	98.0	103.3
September	900	774	102.0	102.9	100.2	104.9
West Hackberry:						
July	900	875	60.6	60.1	60.1	63.4
August	900	841	64.1	65.9	64.4	65.2
September	900	437 ^c	68.0	68.2	67.8	65.2
Bayou Choctaw:						
July	53	53	5.4	5.4	d	-
August	53	49	5.6	5.7	-	-

^aThis table compares the actual leaching activities with baselines that have been established for the SPR contractor. To allow for contingencies, the contractor baselines are more stringent than the overall baselines established for the SPR program.

^bCumulative oil capacity represents the amount of cavern volume available for storing oil. The figures shown for Bayou Choctaw represent the cumulative leached volume.

^cThe West Hackberry leaching program was stopped for 2 weeks in September to allow scheduled maintenance to be performed. Bryan Mound is scheduled for a similar 2-week scheduled shutdown in October.

^dThe activities at Bayou Choctaw are directed at creating a cavern that will not store oil but will be exchanged for a larger existing cavern owned by Allied Chemical Corporation.

Source: DOE.

Table 9

SPR Preventive, Corrective, and General Maintenance Workload^a
by Site as of August 31, 1984

Craft	St. James		Bayou Choctaw		Weeks Island		Sulphur Mines		West Hackberry		Bryan Mound	
	Empl	Workload	Empl	Workload	Empl	Workload	Empl	Workload	Empl	Workload	Empl	Workload
Mechanics, millwright, welders, pipefitters, & equipment operators	4	1.1	5	1.0	4	5.0	3	2.9	12	3.0	8	2.1
Electricians	1	2.7	2	.8	2	2.4	1	2.4	9	2.0	10	1.1
Instrumentation and control technicians	2	.4	3	1.3	3	1.6	2	.6	11	.9	7	1.4
Roustabouts and other laborers	3	4.0	4	1.3	4	1.6	5	1.0	4	6.5	13	1.6
Foremen and supervisors	2	0	3	.1	2	.1	1	0	5	0	5	0
Painters ^b	<u>1</u>	14.0	<u>2</u>	3.9	<u>0</u>	(c)	<u>0</u>	(d)	<u>5</u>	12.2	<u>0</u>	(e)
Total employees	<u>13</u>		<u>19</u>		<u>15</u>		<u>12</u>		<u>46</u>		<u>43</u>	

^aWorkload is in months of work that the craft group needs to complete. DOE uses an estimate that 1 month is equivalent to 22.2 days of work.

^bPainting is primarily a general maintenance activity.

^cThe Project Office has identified 3,729 hours of painting to be done. This is the equivalent of 24 months of work for one painter.

^dThe Project Office has identified 393 hours of painting to be done. This is the equivalent of 2.5 months of work for one painter.

^eThe Project Office has identified 576 hours of painting to be done. This is the equivalent of 3.7 months of work for one painter.

Source: DOE.

Table 10

SPR Corrective Maintenance Backlog^a for All SPR Sites

Craft	3/31/84		4/30/84		5/31/84		6/30/84		7/31/84		8/31/84	
	Empl	Backlog	Empl	Backlog	Empl	Backlog	Empl	Backlog	Empl	Backlog	Empl	Backlog
Mechanics, millwright, welders, pipefitters, & equipment operators	36	1.8	36	1.9	36	1.9	36	1.6	36	2.0	36	1.5
Electricians	16	1.9	16	2.0	16	1.8	25	.9	25	1.1	25	1.1
Instrumentation and control technicians	19	.8	19	.8	19	.7	28	.5	28	.7	28	.6
Roustabouts and other laborers	35	1.7	35	1.7	35	1.1	32	1.1	32	1.2	33	.9
Foremen and supervisors	16	0	16	.1	16	.1	18	.1	18	.1	18	0
Painters	<u>0</u>	0	<u>0</u>	0	<u>0</u>	(b)	<u>8</u>	1.4	<u>8</u>	.7	<u>8</u>	.6
Total employees	<u>122</u>		<u>122</u>		<u>122</u>		<u>147</u>		<u>147</u>		<u>148</u>	

^aBacklog is months of work that the craft group had not performed. This does not include preventive maintenance and general maintenance work that must be performed by the same craft group employees. DOE uses an estimate that 1 month is equivalent to 22.2 days of work.

^bA backlog of 4.2 months for one painter was identified.

Source: DOE.

Table 11Prior GAO Quarterly 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).

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