

GAO

Fact Sheet for the Chairman,
Subcommittee on Environment, Energy
and Natural Resources, Committee on
Government Operations, House of
Representatives

August 1987

OIL RESERVE

Status of Strategic Petroleum Reserve Activities as of June 30, 1987



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Resources, Community, and
Economic Development Division

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August 26, 1987

The Honorable Mike Synar
Chairman, Subcommittee on Environment,
Energy, and Natural Resources
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

In your December 9, 1985, letter, and in subsequent discussions between my staff and your office, you requested that we continue to report on a quarterly basis on the Department of Energy's (DOE) progress in developing, operating, and filling the Strategic Petroleum Reserve (SPR) and in complying with the requirements of applicable law.

This fact sheet covers events and activities related to DOE's progress in developing, operating, and filling the SPR during the third quarter of fiscal year 1987. These events and activities are highlighted below. Details are provided in sections 1 and 2 of the fact sheet.

- As of June 30, 1987, the SPR inventory totaled 527.2 million barrels of oil. During the quarter DOE added 7.2 million barrels of crude oil to the SPR at an average fill rate of 79,000 barrels per day.
- During the last quarter of fiscal year 1987, DOE plans to obligate the remaining balance of its oil acquisition account. All oil purchases are expected to be made from PEMEX--the Mexican national oil company.
- The results of inspections and tests for pipeline deterioration conducted at the Bryan Mound, Texas, and Bayou Choctaw, Sulphur Mines, and West Hackberry, Louisiana, sites were analyzed. Problems have been identified at these sites and plans to investigate and/or repair specific anomalies are expected to be initiated prior to December 31, 1987.

- The full report of the reliability, availability, and maintainability test and exercise conducted from February 17 to March 2, 1987, at the Weeks Island, Louisiana, site confirmed that a number of operational problems occurred during the exercise which shut down some, and on occasion all, of the equipment involved with the test. Overall, however, the report concluded that the test accomplished all objectives. The Weeks Island site performed with a calculated equipment and facilities availability of about 97 percent, based on a total test time of about 309 hours to achieve a minimum of 300 operating hours on the units being tested. The report recommended a number of engineering analyses to resolve the problems encountered.
- On June 1, 1987, DOE placed the entire SPR organization in an immediate drawdown alert status in order to participate in an SPR drawdown readiness exercise (designated SPREX-87). SPREX-87 tested revised drawdown management and sales procedures and further prepared the SPR for a formal exercise currently planned for the fall of 1987. The exercise involved all SPR and contractor personnel activities associated with an SPR drawdown and sale, as well as the physical drawdown of up to 1.0 million barrels of oil from three sites--Bryan Mound, West Hackberry, and Sulphur Mines. This test included a "dry-run" or "shake-down" exercise of the Bryan Mound/Texas City pipeline system. The remaining portion of the test involved a simultaneous drawdown of sour crude from West Hackberry and Sulphur Mines. A full report is expected next quarter.

OBJECTIVES, SCOPE, AND
METHODOLOGY

By agreement, we limited our review to providing primarily statistical information and highlights of major activities that occurred during the period April 1 to June 30, 1987. To obtain this information, we reviewed DOE and contractor program documents, publications, and studies and interviewed DOE managers and operations personnel responsible for planning and managing activities associated with developing and operating the SPR facilities. We did not verify the volume or quality of oil that DOE received or the available capacity of SPR storage facilities. We discussed the information provided in this fact sheet with DOE program officials, who verified its factual accuracy. Their comments have been incorporated in the fact sheet as appropriate.

B-208196

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this fact sheet until 7 days after the date of this letter. At that time, we will provide copies to the Secretary of Energy and other interested parties and make copies available to others upon request. If you would like further information on this fact sheet, please contact me on (202) 275-8545. Major contributors to this fact sheet are listed in appendix I.

Sincerely yours,


Flora H. Milans
Associate Director

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ABBREVIATIONS

ARCO	Atlantic Richfield Company
CIP	Capital Improvement Program
DOE	Department of Energy
GAO	General Accounting Office
PEMEX	Petroleos Mexicanos
RAM	reliability, availability, and maintainability
RCED	Resources, Community, and Economic Development Division
RWIS	raw water intake structure
SPR	Strategic Petroleum Reserve

SECTION 1

STATUS OF STRATEGIC PETROLEUM RESERVE

ACTIVITIES AS OF JUNE 30, 1987

The Energy Policy and Conservation Act (Public Law 94-163, Dec. 22, 1975), as amended, authorized the creation of the Strategic Petroleum Reserve (SPR) to store up to 1 billion barrels of crude oil for use if an oil supply disruption occurred. To meet the act's goals, the Department of Energy (DOE) established a three-phase plan to develop capacity to store 750 million barrels of oil. The schedule for completing this capacity depends upon budgetary decisions now before the Congress and the administration.

Initially, the plan 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. It also involved additional storage capacity development at the sites; the construction of a marine terminal at St. James, Louisiana; and the development of a new site at Big Hill, Texas.

The various SPR storage sites are connected by pipeline to four marine terminal complexes for crude oil deliveries during site development and for oil drawdown and distribution during an oil supply disruption:

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

The SPR Program Office in Washington, D.C., is responsible for overall program management and planning activities for achieving the goals and objectives of the SPR program. Responsibility for SPR project management and implementation activities is assigned to the Oak Ridge Operations Office in Oak Ridge, Tennessee. These activities, as delegated by the Operations Office, are carried out through the Project Management Office in New Orleans, Louisiana. Under a 5-year management, operation, and maintenance contract, Boeing Petroleum Services, Inc., provides the necessary qualified

personnel and services to run the government-owned SPR facilities. DOE retains responsibility for overall project management and technical direction, while Boeing is responsible for SPR's day-to-day management.

This fact sheet discusses activities affecting the SPR that occurred during the quarter ending June 30, 1987, including (1) oil-fill activities, (2) the status of the oil acquisition and transportation account, (3) storage site development activities, (4) oil distribution improvement and enhancement activities, and (5) an update on previously reported issues.

SPR OIL-FILL ACTIVITIES

DOE reported that 7.2 million barrels of crude oil were added to the SPR inventory during the quarter ending June 30, 1987, increasing it to 527.2 million barrels. The crude oil received this quarter was purchased under the terms of 1-year contracts with PEMEX (the Mexican National Oil Company) and Transworld Oil U.S.A., Inc., and under a memorandum of understanding with the Naval Petroleum Reserve. About 6.0 million barrels were delivered under the PEMEX contract. An additional 1.2 million barrels of domestic crude oil were delivered by Transworld, which completed the delivery of 3.64 million barrels of oil under that contract. DOE also received 1,369 barrels of the Reserve's oil in the final settlement of in-transit loss and over-delivery calculations by two of the pipeline companies that previously transported the oil from California to the SPR.

The average fill rate for the quarter was about 79,000 barrels per day (see fig. 2.1 for further information on SPR oil acquisition and fill activities). Of the 527.2 million barrels of oil in storage, 36 percent is sweet (low sulfur) crude, 52 percent is sour (high sulfur) crude, and about 12 percent is a combination of lower quality (sulphur and gravity) crude oils. Oil added to the SPR this quarter did not alter the relative percentages of these types of oil.

DOE plans to purchase its crude oil supplies during the last quarter of fiscal year 1987 under the PEMEX contract.

STATUS OF SPR OIL ACQUISITION AND TRANSPORTATION ACCOUNT

According to DOE, its oil acquisition and transportation account provides funds for (1) SPR oil procurement; (2) associated transportation costs, such as pipeline, tanker, and marine terminal activities; (3) U.S. Customs duties; (4) Superfund taxes; and (5) miscellaneous costs, such as administrative expenses associated with acquiring and transporting the oil. The Omnibus Budget Reconciliation Act of 1981 (Public Law 97-35, Aug. 13, 1981) provides that if an SPR oil drawdown occurred, this account would

also fund the federal cost of withdrawing the oil from the storage caverns and transporting it to the point where private purchasers would take title. Receipts from the sale of oil would go into this account.

During the quarter, DOE made payments of \$171 million for oil acquisition and transportation. The SPR Program Office estimated that as of June 30, 1987, DOE had unpaid obligations of about \$173 million and unobligated funds of about \$56 million.

The SPR petroleum account contained \$526 million for use in fiscal year 1987. According to a DOE budget official, more than \$190 million (\$134 million in obligated funds and \$56 million in unobligated funds) is available for oil purchases in the fourth quarter, and DOE plans to purchase about 6.6 million barrels during that period. Based on current market prices, we estimated that these purchases will require about \$140 million. A DOE official indicated that DOE intends to obligate any remaining 1987 funds for October and November deliveries under the PEMEX contract.

CONGRESSIONAL ACTION ON SPR FISCAL YEAR 1988 BUDGET

H.R. 2712, a bill making appropriations for the Department of Interior and related agencies for fiscal year 1988, was passed by the House on June 25, 1987. According to DOE officials, it establishes funding levels commensurate with (1) filling the SPR at an annual average rate of 75,000 barrels per day, (2) continuing to leach additional capacity at the West Hackberry and Bayou Choctaw sites, and (3) beginning leaching at the Big Hill site. This bill appropriates about \$604 million for the oil acquisition and transportation account and about \$164 million for continued development, operation, and management of the SPR. This represents an increase of \$476 million for oil purchases and \$22 million for site development over the amount included in the administration's fiscal year 1988 SPR budget proposal. The bill was referred to the Senate Committee on Appropriations on June 30, 1987.

SPR SITE DEVELOPMENT ACTIVITIES

During the quarter, oil was injected into the Bayou Choctaw cavern 17 for the first time. The first shipment of oil was also delivered to the ARCO terminal in Texas City, Texas, for use in filling the newly completed pipeline to the Bryan Mound site. Completion of the pipeline between the ARCO terminal and Bryan Mound raised the SPR distribution capacity by 1 million barrels per day. Progress on the Big Hill site development continued. According to the SPR Director, DOE expects to be in a position either to begin leaching or to place the site in a standby for leaching condition on October 1, depending upon budgetary decisions now before the Congress.

West Hackberry

During the quarter, Boeing resumed leaching activities at the last phase II cavern and continued leaching the single phase III cavern. Boeing also added about 2.0 million barrels of new oil along with about 400,000 barrels transferred from Sulphur Mines to the West Hackberry inventory. As a result, as of June 30, 1987, 9 of the 16 phase II caverns at West Hackberry were full, containing 89.5 million barrels; 4 were in a final-fill status, containing 31.8 million barrels; and 2 were in a leach/fill status, containing 9.8 million barrels.

Repairs on the West Hackberry brine disposal line--replacing over 4,200 feet of pipeline, patching an additional 40-foot section, and installing an oxygen scavenging system to remove oxygen in the pipeline to inhibit corrosion--are now complete. However, because DOE believes other sections of this 27-mile pipeline may have been weakened by corrosion similar to the sections replaced, it has limited the use of the brineline to 360,000 barrels of brine daily. This is about one-third of its initial rated capacity.

The brine disposal line received a hydrostatic test in March 1987 that served to establish the capacity limit of 360,000 barrels a day. On April 21 and 25, 1987, the brine line was subjected to a second hydrostatic integrity test compatible with the 360,000 barrel limitation that included aerial inspection along the pipeline's 27-mile length. DOE concluded that no leaks existed and maintained the restricted capacity limit.

The project to convert West Hackberry's raw water intake structure (RWIS) from a manual (manned) to an automatic (unmanned) operation has been discussed in our quarterly reports since March 31, 1986. The project was started in July 1985 with a scheduled completion date of April 1986. That completion date was not met, and because of continuing problems with the program software and lack of documentation, DOE has been unable to fully test the system. Our last quarterly reported that DOE had taken possession of the instrumentation and that Boeing planned to test the RWIS system instrumentation in April 1987.¹

According to a Boeing engineer, a verification test of the entire site instrumentation and control system, including the RWIS, was planned by Boeing to cover a 3-week period beginning April 6, 1987. This Boeing engineer said that the test began as scheduled, but was shut down the following day, April 7, 1987, because of software problems. Another Boeing engineer said that documentation discrepancies also contributed to the decision not to continue the

¹Status of Strategic Petroleum Reserve Activities as of March 31, 1987, (GAO/RCED-87-135FS, May 14, 1987).

test. He said that Boeing's audit of the documentation initiated immediately after the software malfunction disclosed discrepancies in the Summary of Instruction List and the loop drawings such as information gaps and missing documents. These documentation deficiencies would have caused early termination of the test even if there had been no software malfunction. The engineer said that the verification test has been rescheduled to begin on July 20 and end on August 21, 1987.

Last quarter, we discussed an inspection survey of the West Hackberry crude oil pipeline between the site and the Sun Oil Company terminal in Nederland, Texas, and the plans to investigate selected points on the pipeline. A Boeing engineer said that four points will be investigated on the pipeline when the contracting process is complete. The current schedule is to award the contract in mid-July 1987. The contract period will be 60 days from the notice-to-proceed date, which is planned for late July 1987. The estimated cost is \$99,000.

Sulphur Mines

In our prior report, we discussed an inspection of Sulphur Mine's crude oil pipeline. The pipeline is 16 miles long and ties into the West Hackberry crude oil pipeline that connects the West Hackberry site to the Sun Oil Company's terminal in Nederland, Texas. According to Boeing correspondence, the inspection results showed that pipeline erosion had progressed between 1983 and 1986. The 1986 survey by C.E. Vetco Services, Inc., using an electronic pig measuring device, showed three locations on the pipeline having over 50-percent wall penetration classified as severe, whereas the 1983 survey by AMF Tuboscope, Inc., showed no locations with 50-percent wall penetration.

In April 1987, Boeing investigated two of the three anomalies, classified as severe, by excavation and examination. According to a Boeing engineer, one pipeline anomaly was internal and one was external. Boeing examined the internal anomaly with ultrasonic testing, and the results showed the pipewall thickness to be .240 inch, actually a small variance from the normal thickness of .260 inch. Boeing concluded that the anomaly is a mill defect. The second anomaly was on the outside, on top of the pipe. This anomaly, according to the Boeing engineer, was a depression in the pipewall, similar to a punch mark, and showed no evidence of erosion, corrosion, or pipe deterioration. This depression, was 50 mils deep (and about 1/2-inch long), which means the pipewall thickness at this point is .210 inch compared to normal thickness of .260 inch (about a 20-percent difference). Boeing concluded that this anomaly was also a mill defect.

According to the Boeing engineer, the electronic pig readings were not very accurate and that after inspection the survey data may be recalculated. Repairs were not required at this time. The

third severe anomaly on this pipeline is scheduled for inspection before December 31, 1987.

As an element in a SPR drawdown exercise (SPREX-87) initiated by the DOE Program Office on June 1, 1987, Sulphur Mines participated with West Hackberry in a simultaneous draw down on June 20, 1987, with the crude oil sent to the Sun Marine terminal in Nederland, Texas. (See p. 18.)

Bryan Mound

Bryan Mound received one crude oil shipment of about 500,000 barrels this quarter. The oil was off-loaded at the ARCO terminal in Texas City, Texas, and most was used to fill the recently completed crude oil pipeline between the site and the ARCO terminal. This pipeline is one facet of the enhancements to improve SPR oil distribution. (See distribution enhancement section.)

In May 1987, Bryan Mound's on-site, 36-inch brineline developed a leak and a section had to be replaced. According to the Bryan Mound DOE site manager, the problem occurred near the pumps. This particular point was patched 2 years ago. Another patch was attempted this time, but did not hold. A diver was sent into the pipeline to examine its condition and made casts (impressions) of the area beyond the point that leaked. The casts showed considerable wear in the form of channeling along the bottom of the pipeline that was serious enough to warrant replacing about 150 feet. This on-site brineline was being used for the cavern 5 reconfiguration project. The repairs were made between May 4 and May 20, 1987.

Our last quarterly report discussed the results of the Bryan Mound crude oil pipeline inspection in mid-December 1986 and Boeing's plan to examine two moderate anomalies. In June 1987, Boeing excavated two points on the 30-inch crude oil pipeline to analyze these anomalies. The anomaly on the pipeline between the site and the Seaway terminal was found to be inside the pipe and was analyzed with ultrasonic testing. At the point of the anomaly, the pipewall thickness was about 20-percent less than the normal thickness (.284 inch). Boeing concluded that this anomaly was a mill defect and that no repair was needed.

The other anomaly is between the site and Jones Creek Tank Farm. This anomaly is on the outside of the pipe and about 5 inches long, 1 inch wide and .155 inch deep. In this instance about one half the thickness of the pipewall (originally .312 inch) has been penetrated. According to Boeing, the anomaly probably stemmed from a pipeline coating puncture that occurred during construction, but shows no signs of recent corrosive action; possibly because of the cathodic protection system on the pipeline that protects the metal from corrosive action.

A plan and schedule to perform repair is expected by July 15, 1987. This anomaly does not prohibit the site from achieving the required drawdown capacity of 1.1 million barrels per day.

Weeks Island

Our prior quarterly reported the results of a reliability, availability, and maintainability (RAM) test and exercise at the Weeks Island site based on a Boeing March 4, 1987, preliminary assessment synopsis of the test and exercise.

In May 1987, Boeing issued the Weeks Island FY '87 Systems Test and Exercise Report. According to this report the primary objective of the test and exercise was to obtain empirical data on the Weeks Island crude oil equipment (pumps, motors, inert gas generator) over an extended period to demonstrate reliability and verify operation and failure rate predictions. The RAM test and exercise started at 3:33 p.m. on February 17, 1987, and ended on March 2, 1987.

The May report elaborated on a number of problems itemized in the earlier synopsis. The report's principal findings were as follows:

- There were five shutdowns involving the inert gas generator (IGG)--a safety device which creates a blanket of non-combustible gas to provide an inert environment inside the mine as oil is pumped out, two for apparent malfunction of the IGG high temperature shutdown switch (22 minutes), two for excessive cooling water pressure (5.3 hours), and one for the possibility that cooling water pressure dropped below the minimum required (10 minutes). The current IGG system has no instrumentation to indicate the causes of shutdowns. A modification to the system to identify the causes has been approved. In DOE's opinion, the IGG operated adequately to achieve the planned drawdown rate.
- There were three pump shutdowns: the first occurred when three valves, which control the flow of the oil through the metering device, closed for unknown reasons; the second occurred when the main control valve closed for reasons unknown and restricted the oil flow while the control room operator was making a minor adjustment; and the third occurred as a precautionary measure when a circuit board that provides safety protection for the pumps failed and the uninterruptible power supply (UPS)² alarm sounded. Subsequently, it was learned that an off-site Gulf States Utilities transformer failure coincided with the UPS alarm.

²The UPS provides backup power to the computer that controls the site instrumentation and control system.

In addition to this failure during the exercise, the UPS had experienced failure problems the day before the test started. Boeing has recommended an alarm for the control room to alert the operator when there is an UPS problem.

The Boeing report concludes that the Weeks Island fiscal year 1987 systems test and exercise was a very successful team work effort and accomplished all objectives. The preliminary results indicate that, from a RAM standpoint, the Weeks Island site performed with a calculated availability of about 97 percent. This value is based on a total test time of about 309 hours to achieve a minimum of 300 operating hours on the units being tested. The report states that this percentage compares favorably with the predicted value of 93.1 percent published in the Weeks Island Drawdown Assessment Report.

A number of engineering analyses have been recommended to resolve the problems encountered, and the report recommended additional RAM-oriented system tests and exercises to gain additional confidence in the operation and failure rate predictions.

Bayou Choctaw

Our last report discussed the site construction work at Bayou Choctaw on the phase II cavern 17 and phase III cavern 101. The cavern 101 work of constructing surface piping tying the cavern to existing oil, water, and brine pipelines is ongoing. Completion is scheduled for July 1987, at which time leaching will begin. As of March 31, 1987, cavern 17 was available for oil fill. Deliveries from the St. James terminal began in April and by June 30, 1987, 5,174,306 million barrels had been received. DOE plans to ultimately store 10 million barrels of oil in this cavern.

On May 8, 1987, DOE awarded a \$1,427,000 contract to Coggins System, Inc., to integrate Bayou Choctaw caverns 101 and 17 into the site control room instrumentation and control system. The contractor received notice-to-proceed on May 21, 1987, and has until August 31, 1988, to complete the contract. Coggins is the same company that has had the contract to automate the RWIS at the West Hackberry site and has all of the Big Hill and Bryan Mound instrumentation and control work.

As a result of a November 1986 inspection of the crude oil pipeline between Bayou Choctaw and the St. James Terminal, Boeing is planning to investigate one anomaly noted by the test and is currently working on the scope of work. According to a Boeing engineer, the affected pipeline section is in a cane field where about 200 feet of pipe can be excavated, the most accessible location on the pipeline that primarily crosses swampy areas and is covered with water. According to the engineer, an invitation for

bid may be issued in July 1987, but the actual work will not begin for 3 or 4 months.

Big Hill

As of June 30, 1987, DOE and the Fruin-Colnon Corporation were still negotiating a final settlement on the I-A contract for site surface construction that was to have been completed on February 14, 1986. DOE assessed \$10,500 per day in liquidated damages (a financial settlement based upon late performance of contract) from February 15, 1986, to August 20, 1986, when it determined that the work was substantially complete and acceptable. Fruin-Colnon is contesting DOE's substantially-complete date determination. The only remaining open item in the contract is delivery of one piece of equipment, a portable meter prover.

Fruin-Colnon corporate officials met with the SPR Project Manager on June 17, 1987, to review the status of negotiations and agree on the course of future negotiations. Remaining issues include extended overhead, changes in sequence of work, disruption, rescheduling and acceleration, and their mitigating impact on liquidated damages. Both parties agreed that it is desirable to continue negotiations, but a DOE contracting official said that if an impasse continues between DOE and Fruin-Colnon, the DOE contracting officer could unilaterally issue a modification for the net liquidated damages for the final settlement. In this case, Fruin-Colnon would probably challenge the decision with appeals, and possibly court action.

The other Big Hill contracts are complete or progressing generally on schedule.

- The crude oil pipeline contract for the 24.2-mile pipeline from Big Hill to the Sun Oil terminal is 98-percent complete compared with a 99-percent objective. The remaining physical work includes repairs at road cuts where the pipeline crosses and right-of-way cleanup. The scheduled contract completion date is August 15, 1987. The work to tie-in the pipeline at the Sun Oil terminal will be accomplished under a separate contract.
- The I-C contract for constructing a 14.1-mile brine disposal pipeline, a 5.3-mile raw waterline, and an overhead power transmission line between the RWIS and the storage site was completed in June 1987. All work has been tested according to contract requirements, accepted for use and possession by DOE, and transferred to Boeing.
- The EBASCO Stage II contract for surface construction at nine caverns at the site, including pipeline tie-ins to connect the caverns to the oil, brine, and water systems, is about on schedule: 22-percent complete compared with a

24-percent objective. DOE's actions during the quarter appears to have helped achieve this performance. We reported last quarter that the work was significantly behind schedule and that DOE had issued a "show-cause" notice on March 2, 1987, to encourage better performance by EBASCO in meeting the planned schedule. This "show-cause" notice asked EBASCO to present any explanations showing why the company failed to perform by completing certain milestones within the time required by the terms of the contract. The SPR Project Manager and EBASCO President have held monthly meetings at the site since March 1987, and weekly meetings are held at the site, with DOE; Walk, Haydel and Associates (DOE's architectural and engineering contractor); and EBASCO to discuss issues and resolve problems aimed at achieving the October 1987 ready-to-leach milestone.

SPR DRAWDOWN EXERCISE (SPREX-87)

On June 1, 1987, DOE's Deputy Assistant Secretary for Petroleum Reserves placed the entire SPR organization in an immediate drawdown alert status for purposes of participating in an SPR drawdown readiness exercise (designated SPREX-87). According to the guidelines issued by the Deputy Assistant Secretary, SPREX-87 was an informal SPR training exercise, limited to the SPR organization and designed to ascertain the readiness of existing SPR drawdown systems and contractor personnel to execute a drawdown and sale with a minimum of advance notification. SPREX-87 tested revised drawdown management and sales procedures, and further prepared the SPR for a formal exercise of DOE's energy emergency management system, involving the use of the SPR, currently planned for the fall of 1987. The SPREX-87 included all SPR and contractor personnel activities associated with an SPR drawdown and sale, as well as the physical drawdown of up to 1 million barrels of oil from selected storage sites to their distribution terminals. Three sites were selected for physical drawdown: Bryan Mound for 500,000 barrels, on June 16, 1987, and West Hackberry and Sulphur Mines simultaneously on June 20, 1987, for a combined total of about 500,000 barrels.

Bryan Mound held its drawdown on June 16 and 17, 1987. Nearly 500,000 barrels of oil was moved from the site through the new pipeline to the ARCO terminal. The purposes of the exercise, according to the drawdown test plan, were to demonstrate (1) ARCO's capability to receive crude oil at the 1-million-barrels-per-day rate (41,667 barrels per hour) at its Texas City facility and (2) the site's capability to draw down and ship the oil through the new pipeline to ARCO at Texas City at the 1-million-barrels-per-day rate. The plan proposed to maintain the 1-million-barrel-per-day rate for 8.5 hours.

A synopsis of the test was prepared by Boeing. According to this synopsis, the drawdown test was on-line at 1:33 p.m., June 16, 1987, but did not achieve the design flow rate of 1 million barrels per day until 4:11 a.m., June 17, 1987, because of equipment problems at Bryan Mound and ARCO. Early in the test, only four of the five crude oil pumps needed to reach the 1-million-barrels-per-day rate were available because two pumps had seals blown out during their initial start up; ARCO requested a shut-down that lasted about 2 hours because of plugged strainers; and shortly following this event, the test was shut down for about another 2 hours because of a leaking flange on Bryan Mound meter skid equipment. About an hour later, a crude oil pump (originally one with blown seal that was repaired) developed an electrical problem and was off-line for about 45 minutes. The other pump that had experienced a blown seal was also repaired and put on-line at 2:20 a.m., June 17, 1987. At 4:11 a.m., the 1-million-barrel-per-day rate was reached but dropped down almost immediately to a sustained rate of about 970,000 barrels a day for the remainder of the test that terminated at 7:05 a.m., June 17, 1987. About 490,000 barrels of oil were actually moved in this exercise.

According to the DOE systems analyst, this test was more like a "dry-run" or "shake-down" exercise to get the bugs out of the Bryan Mound/Texas City pipeline system, and since the planned results were not achieved, another test exercise will probably be scheduled. The drawdown exercise, however, confirmed the pipeline's capacity to handle 1 million barrels per day. A full report of the June 16, 1987, test is scheduled for August 17, 1987.

West Hackberry and Sulphur Mines held their drawdown test on June 20, 1987. The physical transfer of about 500,000 barrels of oil from the two sites was expected to be accomplished at a combined daily flow rate of 1,090,000 barrels--990,000 barrels per day from West Hackberry and 100,000 per day from Sulphur Mines. The SPREX-87 Simultaneous Drawdown of West Hackberry and Sulphur Mines and Procedures rendered this exercise unique and significant because

- a simultaneous drawdown of the West Hackberry and Sulphur Mines sites had never been performed,
- a drawdown and oil shipment from Sulphur Mines to the Sun Oil Marine terminal has never been performed, and
- a drawdown of West Hackberry sour oil caverns has not been performed since 1980.

Boeing's synopsis of the West Hackberry and Sulphur Mines SPREX-87 drawdown to Sunoco, issued June 22, 1987, claims that the exercise was an unqualified success. The drawdown began at West Hackberry at 7:05 a.m., and at Sulphur Mines at 10:16 a.m.,

June 20, 1987. By 11:30 a.m., the combined average flow rate from the two sites was about 958,600 barrels a day, and at 7:30 p.m., the combined flow reached its peak of 1,047,936 barrels per day. At one point, the Sulphur Mines output reached a 123,960 barrel-per-day rate and West Hackberry achieved a high of 967,080 barrels per day. The Sulphur Mines drawdown was terminated at 7:46 p.m. and West Hackberry at 11:15 p.m. The total gross barrels of sour crude moved from both sites was about 628,400 (West Hackberry 582,700 and Sulphur Mines 45,700). According to the Boeing synopsis, there were no significant equipment problems.

The SPREX-87 drawdown exercise was controlled by an exercise control team in Washington, D.C., comprised of personnel from DOE's SPR Program Office, Office of the General Counsel, and Aerospace Corporation. The exercise control team will be responsible for preparing an Exercise Assessment Report at the end of SPREX-87 and submitting it to the Deputy Assistant Secretary of Energy. This report is expected to be available during the next quarter.

SPR CONTRACT NEGOTIATIONS

During the quarter, DOE continued its negotiations with PEMEX concerning previous deliveries. DOE was also involved in contract extension negotiations with two of its direct support service contractors.

As noted in our last report, DOE and PEMEX were in disagreement over a DOE claim of \$287,104 related to the basic sediment and water factor for crude oil delivered under the PEMEX I contract. Counter offers are continuing. In late April 1987, according to a DOE contract specialist, PEMEX offered to settle the claim at substantially less than half of the amount claimed by DOE. According to DOE, after careful consideration of this offer, a counter offer of \$237,000 was made in June 1987. DOE is awaiting PEMEX's reply.

We also noted last quarter that DOE issued a notice of intent to exercise the contract option to Systematic Management Services, Inc. Systematic Management provides most of the management support services for the SPR. The contract expires on August 28, 1987. According to a DOE contract specialist, Systematic Management submitted a proposal to DOE in April 1987, and following normal operating procedures, DOE's Inspector General has been requested to review the proposal. If the Inspector General's review is favorable, DOE will prepare a prenegotiation plan. The negotiations are expected to occur in August 1987. The 1-year option period will commence August 29, 1987.

The Walk, Haydel and Associates contract for Capital Improvement Program (CIP) work expired May 31, 1987. According to a DOE contract specialist, this completed the first option year on the CIP contract. On April 1, 1987, DOE issued a request for a

proposal to Walk, Haydel and received a response on April 27, 1987, for the second option year. According to the DOE contract specialist, because of the time lag of the Walk, Haydel response and the time required for the DOE Inspector General audit, little time was available for negotiations before the contract expired. In addition, Walk, Haydel's cost proposal for the second-year option was much more than DOE's estimate and included tasks not included in DOE's request for proposal. According to the contract specialist, DOE was not able to prepare the prenegotiation plan, including review and approval, and complete the negotiations with Walk, Haydel by May 31, 1987. As a result, DOE and Walk, Haydel executed a bilateral letter contract modification May 29, 1987, extending the performance period for Walk, Haydel for 1 month to June 30, 1987, and limiting the expenditures for the period to \$930,922. The contract specialist said that DOE made a "task realignment," deleting some tasks to keep down the cost of this modification. DOE and Walk, Haydel executed another letter contract modification on June 26, 1987, extending the performance period for another month to July 31, 1987. Because the prenegotiation plan is still in process, expenditures are limited to an amount about equal to that in the first letter contract modification. Negotiations with Walk, Haydel are scheduled to begin and be completed during the next quarter.

SPR OIL DISTRIBUTION IMPROVEMENTS AND ENHANCEMENTS

As reported previously, DOE has planned for a number of SPR oil distribution enhancements, including plans to rectify problems that resulted when Texoma Pipeline Company and Seaway Pipeline, Inc., sold their interstate crude oil pipelines. The objective of the planned enhancements is to increase the SPR crude oil distribution capability to match the SPR's 4.5-million-barrel-per-day oil drawdown capability--based on a planned 750-million-barrel reserve. This quarter, the major achievement was the completion of the new 40-inch crude oil pipeline extending 46.2 miles between the Bryan Mound site and the ARCO terminal at Texas City, Texas. This crude oil pipeline, according to a DOE systems analyst, increases the Bryan Mound (Seaway complex) drawdown/distribution capability from 390,000 barrels per day to 1,100,000 barrels per day. As stated previously, the pipeline was filled with crude oil for the first time on May 19 and 20, 1987, with one shipment from PEMEX discharged at the ARCO terminal. Terminal modifications at the ARCO terminal needed to support the SPR were completed in May 1987, and acceptance tests were performed on June 16 and 17, 1987, as part of the SPREX-87 exercise.

UPDATE OF ISSUES FROM
PRIOR REPORTS

Current Status of Overpayments for Oil
Delivered to St. James Terminal

We last reported on efforts to collect overpayments of oil delivered to the St. James Terminal in our quarterly report GAO/RCED-84-92, dated January 13, 1984. According to the Defense Fuel Supply Center, incorrect quantity determinations based on tables used to convert levels of crude oil in the terminal's receiving tanks to barrels of oil led to overpayments to certain suppliers. DOE initiated action to recover these overpayments. The current status of outstanding claims is as follows:

Table 1.1: Outstanding St. James Terminal Overpayment Claims

<u>Supplier</u>	<u>Claims outstanding</u>
Houston Oil & Refinery	\$1,893,773
Listo	592,232
USA Petrochem	364,948
US & SA Enterprises	<u>2,628,350</u>
Total	<u>\$5,479,303</u>

Source: DOE.

According to a Defense Fuel Supply Center Assistant Counsel, of the outstanding claims, the Listo case is currently at the Department of Justice for collection proceedings on a final unappealed contracting officer's decision. For USA Petrochem (USA Petroleum Corporation), an initial decision by the United States Court of Claims in the amount of \$328,453, was vacated by the federal circuit court and remanded to the claims court for further proceedings. The cases of US & SA Enterprises and Houston Oil and Refinery are still pending at the Armed Services Board of Contract Appeals.

Compliance with the Cargo Preference Act

SPR oil deliveries are subject to the Cargo Preference Act of 1954. As a government procurement activity using oceangoing vessels, the SPR oil purchase program must transport at least 50 percent of the oil in commercial U.S.-flag tankers. DOE and the Maritime Administration, the Department of Transportation agency that administers the Cargo Preference Act, agreed to use long-ton miles for SPR oil shipments to measure compliance. (Long-ton miles

combine the amount of oil carried and the distance the oil is moved.) GAO last reported on this issue in its quarterly report GAO/RCED-86-84, dated January 29, 1986.

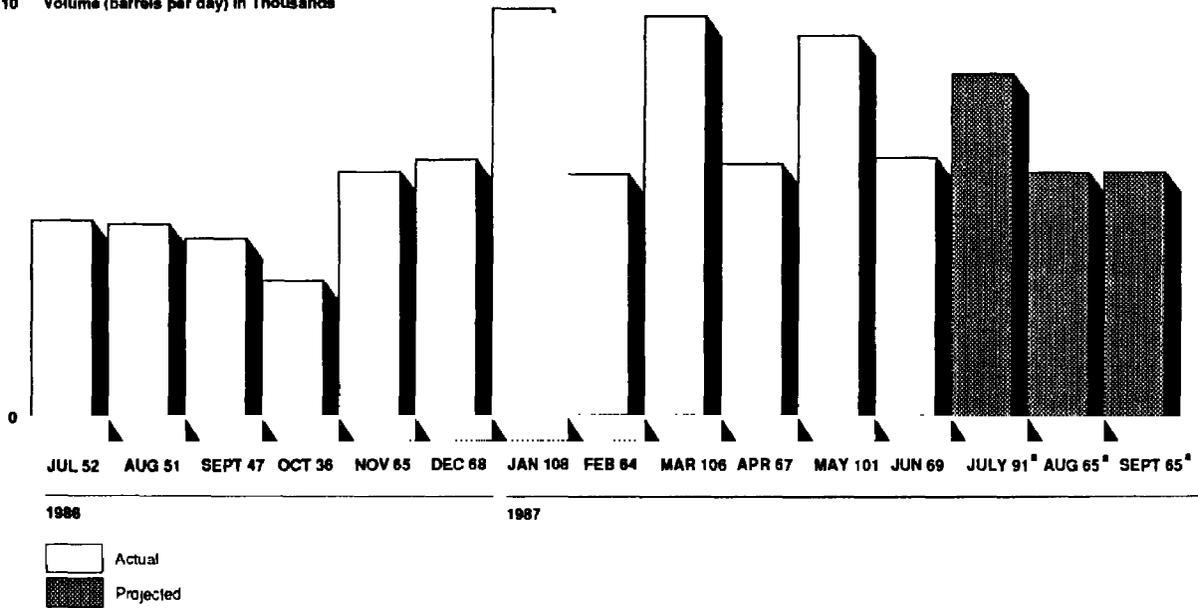
From 1977 through 1984, U.S.-flag tankers accounted for 49 percent of total long-ton miles. DOE estimated that U.S.-flag tankers accounted for 50 percent in 1985. In 1986, the figure was 50.43 percent and, for the first 6 months of 1987, 51.56 percent.

SECTION 2

DATA ON THE STATUS OF THE STRATEGIC PETROLEUM RESERVE

Figure 2.1: Average Daily SPR Oil Receiving Rate^a

110 Volume (barrels per day) in Thousands



^a Daily receiving rate for July, August, and September 1987 based on DOE projection of future deliveries and is subject to change.

Source: DOE

Table 2.1: Status of SPR Oil Acquisition and Transportation Funds as of June 30, 1987^a

<u>Funds made available</u>	<u>Amount</u> (millions)
Fiscal year 1977 to 1981 appropriations ^b	\$ 6,665
Fiscal year 1982 appropriations	3,684
Fiscal year 1983 appropriations	2,074
Fiscal year 1984 appropriations	650
Fiscal year 1985 appropriations	<u>2,050</u>
Total	<u>\$15,123</u>
 <u>Funds used or committed</u>	
Fiscal year 1977 to 1981 payments	\$ 4,859
Fiscal year 1982 payments	3,687
Fiscal year 1983 payments	1,641
Fiscal year 1984 payments	2,329
Fiscal year 1985 payments	1,621
Fiscal year 1986 payments	397
Estimated fiscal year 1987 payments ^c	358
Estimated DOE unpaid obligations as of June, 1987 ^d	<u>173</u>
Total	<u>\$15,065</u>
Estimated unobligated funds at DOE	\$ 56

^aThe Omnibus Budget Reconciliation Act of 1981 (Public Law 97-35, Aug. 13, 1981) established an off-budget SPR Petroleum Account, effective October 1981, to pay for petroleum acquisition and transportation. The fiscal year 1986 budget proposed that outlays in 1986, reflecting payments for deliveries occurring at the end of 1985, be included on budget.

^bIncludes lapsed funds of \$1.93 million.

^cAmount consists of DOE's actual reported payments through May 1987 and DOE's estimated payments for June 1987.

^dUnpaid obligations primarily represent funds that have been obligated for oil deliveries or are obligated to Defense Fuel Supply Center for PEMEX oil transportation costs. The Supply Center estimated that \$2.78 million had been obligated as of June 30, 1987, for future costs.

Source: DOE and Defense Fuel Supply Center.

Table 2.2: Status of SPR Underground Capacity for Crude Oil Storage as of June 30, 1987

<u>Storage facilities</u>	<u>Gross volume planned</u>	<u>Gross volume completed</u>	<u>Permanent capacity planned^a</u>	<u>Capacity available</u>	<u>Capacity filled</u>
- - - - - (millions of barrels) - - - - -					
Phase I sites:					
Bayou Choctaw	48.6 ^b	48.6	46.0 ^b	46.0	46.0
Bryan Mound	75.0	74.0	69.6	69.6	43.1
Sulphur Mines	27.3 ^b	27.3	26.0 ^b	26.0	25.4
Weeks Island	73.0	73.0	73.0	73.0	72.6
West Hackberry	<u>50.4</u>	<u>50.4</u>	<u>47.7</u>	<u>48.2</u>	<u>47.3</u>
Total	<u>274.3</u>	<u>273.3^c</u>	<u>262.3</u>	<u>262.8</u>	<u>234.4</u>
Phase II sites:					
Bayou Choctaw	11.3	11.3	10.0	10.0	5.2
Bryan Mound	134.4	139.3	124.6	124.6	131.4
West Hackberry	<u>179.2</u>	<u>169.8</u>	<u>160.7</u>	<u>141.3</u>	<u>131.8</u>
Total	<u>324.9</u>	<u>320.4</u>	<u>295.3</u>	<u>275.9</u>	<u>268.4</u>
Phase III sites:					
Bayou Choctaw	11.2	-	10.0	-	-
Bryan Mound	36.6	36.6	31.8	31.8	21.3
West Hackberry	11.2	4.0	10.6	-	-
Big Hill	<u>156.8^b</u>	-	<u>140.0^b</u>	-	-
Total	<u>215.8</u>	<u>40.6</u>	<u>192.4</u>	<u>31.8</u>	<u>21.3</u>
Tank and pipelines	-	-	-	-	<u>3.1</u>
Total for SPR	<u>815.0</u>	<u>634.3</u>	<u>750.0</u>	<u>570.5^d</u>	<u>527.2</u>

^aPermanent capacity for oil storage is less than gross volume because a certain volume of unoccupied capacity must be provided for brine.

^bThe final authorized permanent storage for this site is different than what is shown in this table. DOE plans to decommission the 26-million barrel Sulphur Mines site in the 1990s and expand the Bayou Choctaw phase I caverns by 6 million barrels and the Big Hill phase III site by 20 million barrels.

^cDOE acquired and modified existing caverns and a mine containing this gross volume. No leaching was required.

^dThe total capacity available is currently reduced by 28.5 million barrels pending the completion of the Bryan Mound cavern 5 storage configuration enhancement project.

Source: DOE.

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