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Strategic Petroleum Reserve

ANNUAL/QUARTERLY REPORT

February 16, 1994

***U.S. Department of Energy
Assistant Secretary for Fossil Energy
Office of Strategic Petroleum Reserve
Washington, DC 20585***

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TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	1
Key Activities	1
PROGRAM DEFINITION	3
Mission	3
Program Legislation	3
Strategic Petroleum Reserve Plan and Amendments	4
Program/Project Management	5
STORAGE FACILITY DEVELOPMENT PROGRAM	7
Development of the 750-Million Barrel Storage Program	7
Storage Facilities Status	10
Storage Facilities Life Extension Program	13
Planning for 250-Million Barrel Expansion	14
OIL ACQUISITION AND FILL STATISTICS FOR THE FOURTH QUARTER 1993 ..	15
Oil Fill, Calendar Year 1993	15
Oil Acquisition, Calendar Year 1993	15
Cargo Preference Compliance	16
REPORT ON THE REFINED PETROLEUM PRODUCT RESERVE TEST	23
OTHER PROJECT ACTIVITIES	25
Oil Stabilization Program	25
Procurement and Contractor Support	26
Real Estate	26
Security	27
Recovery Program	27
ENVIRONMENT, SAFETY AND HEALTH	29
Environmental Compliance	29
Other Environmental, Safety and Health Actions	29
BUDGET AND FINANCE	31
Appropriations	31
Major Budget and Financing Actions During 1993	31
DRAWDOWN AND DISTRIBUTION	37
Distribution Plan	37
Competitive Sales Procedures	37
Drawdown and Distribution Capabilities	38
1993 Drawdown Systems Tests	39

CUSTOMER SERVICE TO THE NATION AND U.S. REFINERS	42
SPR Protection for the Nation	42
U.S. Refining Industry Access to SPR Oil	42
APPENDIX A Strategic Petroleum Reserve Site Status	46
APPENDIX B Strategic Petroleum Reserve Crude Oil Specifications	57

LIST OF TABLES

Page

TABLE 1	Strategic Petroleum Reserve Oil Storage Configuration	19
TABLE 2	Strategic Petroleum Reserve Oil Fill Inventory	17
TABLE 3	Strategic Petroleum Reserve Oil Fill History	18
TABLE 4	Crude Oil Received Through 1993	21
TABLE 5	Strategic Petroleum Reserve Crude Oil Inventory As of December 31, 1993 . .	22
TABLE 6	Strategic Petroleum Reserve Appropriations	34
TABLE 7	Strategic Petroleum Reserve Crude Oil Streams	40
TABLE 8	Current Drawdown and Distribution Capabilities	41

LIST OF FIGURES

	Page
FIGURE 1 Program/Project Management Structure	6
FIGURE 2 Strategic Petroleum Reserve Complexes and Associated Pipelines and Terminals .	8
FIGURE 3 Annual Strategic Petroleum Reserve Oil Fill	19
FIGURE 4 Cumulative Strategic Petroleum Reserve Oil Fill	20
FIGURE 5 Strategic Petroleum Reserve Annual Funding	32
FIGURE 6 Strategic Petroleum Reserve Cumulative Funding	33
FIGURE 7 Days of Net Import Protection	44
FIGURE 8 Strategic Petroleum Reserve Pipeline and Marine Distribution Capabilities . .	37

EXECUTIVE SUMMARY

Section 165 of the Energy Policy and Conservation Act (Public Law 94-163), as amended, requires the Secretary of Energy to submit annual and quarterly reports to the President and the Congress on activities of the Strategic Petroleum Reserve. Additional prospective information related to the development and fill of the Strategic Petroleum Reserve is required by the Omnibus Budget Reconciliation Act of 1986 (Public Law 99-509). This report combines the fourth quarter 1993 Quarterly Report with the 1993 Annual Report.

KEY ACTIVITIES

APPROPRIATIONS

On November 11, 1994, the President signed the Department of Interior and Related Agencies Appropriations Act, 1994 (Public Law 103-138) which provided \$206,810,000 for operations and program management activities of the Reserve and includes an outlay cap of \$75,580,000 on funds in the SPR Petroleum Account.

LIFE EXTENSION PLANNING

Most of the equipment and systems for operating the Strategic Petroleum Reserve were installed in the late 1970s and early 1980s. They are experiencing an increasing number of failures and increased maintenance costs as they approach and exceed their

original design life of 20 years. During 1993, a comprehensive Life Extension Program was initiated to ensure that the Strategic Petroleum Reserve continues to maintain its mission capability, including drawdown readiness, and remains in compliance with regulatory requirements through the year 2025. Replacement or major overhaul of many of the major systems will be necessary to assure a useful operational life expectancy through the year 2025.

EXPANSION PLANNING

During 1993, the Department continued planning activities for the expansion of the Strategic Petroleum Reserve to one billion barrels. A Draft Environmental Impact Statement for five candidate sites was completed in October 1992. The public comment period closed March 8, 1993. Comments were received requesting the consideration of an alternative means of brine disposal. In response, the Department issued a Supplement to the Draft Environmental Impact Statement on June 4, 1993, for Richton, Mississippi, and Cote Blanche, Louisiana. Public hearings on the Supplement were held in Hattiesburg, Mississippi, and Franklin, Louisiana, in July 1993. The comment period closed on July 26, 1993.

STRATEGIC PETROLEUM RESERVE OIL ACQUISITION

At the end of 1993, the Strategic Petroleum Reserve crude oil inventory was 587.1 million barrels and an additional 184,000 barrels were in transit

to the Reserve. During 1993, crude oil was acquired under a continuous open solicitation for competitive offers and through the transfer of crude oil from the Naval Petroleum Reserves in California (NPR-1). Transfer of NPR-1 crude oil continued through 1993, and acquisition of crude oil by the Defense Fuel Supply Center, the Department's purchasing agent, will continue into 1994 until available funds are expended.

OIL STABILIZATION PROGRAM

In 1993, the Department progressed in quantifying and planning corrective action on two problems that, although readily correctable, have temporarily reduced the availability of some of the oil inventory for draw down. These problems are:

- (1) A higher-than-normal gas content in some of the crude oil apparently from years of intrusion of methane from the surrounding salt formation; and
- (2) Elevated temperatures of some of the crude oil due to geothermal heating that has increased the vapor pressure of the oil.

Investigations are proceeding to determine the extent to which gas intrusion and geothermal heating are impacting the availability of oil for draw down. These investigations should be complete by April 1994. Construction of

heat exchangers for cooling the oil during a draw down is scheduled for completion in March 1995. A National Environmental Policy Act review determined that cooling the oil will have no significant environmental effects, and neither an Environmental Assessment nor Environmental Impact Statement are required. An Environmental Assessment on stabilizing crude oil impacted by the presence of excessive gas is being prepared by the Department. Stabilization of the crude oil affected by gas intrusion will be completed at the end of 1997.

REFINED PETROLEUM PRODUCT RESERVE TEST REPORT

The Energy Policy and Conservation Act Amendments of 1990 require that the Secretary of Energy implement a three-year refined petroleum product reserve test program in each of fiscal years 1992, 1993, and 1994 and transmit a report evaluating the mechanisms demonstrated and other mechanisms and purchases, including the costs and benefits of the options. The test program was never implemented due to lack of funding. However, in response to the legislative requirement, a report is included in this Annual/Quarterly Report.

PROGRAM DEFINITION

MISSION

The Strategic Petroleum Reserve (SPR) is a large crude oil stockpile under the control of the President of the United States. The Strategic Petroleum Reserve mission is to reduce vulnerability to economic, national security, and foreign policy consequences of supply interruptions by discouraging supply disruptions as a tool of other nations, and by adding to crude oil supplies in the event of a disruption due either to political, military, or natural causes. The Strategic Petroleum Reserve is mandated by the Energy Policy and Conservation Act of 1975, as amended, and by the comprehensive energy plans of all Administrations since 1975 in recognition of the long term dependence of the United States on imported crude oil.

PROGRAM LEGISLATION

The Strategic Petroleum Reserve was authorized by Congress with the enactment on December 22, 1975, of the Energy Policy and Conservation Act (Public Law 94-163), which declared it to be United States policy to establish a Strategic Petroleum Reserve of up to one billion barrels of petroleum products to reduce the impact of a severe energy supply interruption and to carry out the obligations of the United States under the International Energy Program.

The provisions of the Energy Policy and Conservation Act regarding the Strategic Petroleum Reserve were amended by title VIII of the Energy Security Act (Public Law 96-294), enacted on June 30, 1980. This Act established a minimum average daily fill rate of 100,000 barrels and precluded sale of Naval Petroleum Reserve Number 1 (Elk Hills, California) crude oil except to fill the Strategic Petroleum Reserve, unless the Strategic Petroleum Reserve was being filled at the minimum rate or had an inventory of 500 million barrels.

The Energy Policy and Conservation Amendments Act of 1985 (Public Law 99-58), enacted on July 2, 1985, extended the provisions of title I, part B, of the Energy Policy and Conservation Act relating to the Strategic Petroleum Reserve until June 30, 1989, and directed the Secretary of Energy to conduct a sale or exchange of 1.1 million barrels of crude oil to test the drawdown and distribution capabilities of the Strategic Petroleum Reserve.

The Omnibus Budget Reconciliation Act of 1986 (Public Law 99-509), enacted on October 18, 1986, amended the Energy Policy and Conservation Act to require that the Strategic Petroleum Reserve be filled at a minimum rate of 75,000 barrels a day until at least 750 million barrels are in storage.

Public Law 100-531, enacted on October 25, 1988, amended the Department of Energy Organization Act

of 1977 (Public Law 95-91), to authorize protective force personnel who guard the Strategic Petroleum Reserve's storage and related facilities to carry firearms while performing official duties and to make arrests without warrants. The legislation also establishes trespass on Strategic Petroleum Reserve property as a Federal offense.

Public Law 101-46, an act to extend Title I of the Energy Policy and Conservation Act, enacted on June 30, 1989, extended the Strategic Petroleum Reserve authorities contained in the Energy Policy and Conservation Act until April 1, 1990. The bill also required the Secretary to submit a report to Congress by February 1, 1990, on alternative means of financing oil acquisition for the Strategic Petroleum Reserve.

Short-term extensions of the Strategic Petroleum Reserve authorities contained in the Energy Policy and Conservation Act were enacted on March 31, 1990, (Public Law 101-262) and August 10, 1990, (Public Law 101-360).

On September 15, 1990, the President signed Public Law 101-383, the Energy Policy and Conservation Act Amendments of 1990, extending the Strategic Petroleum Reserve authorities contained in the Energy Policy and Conservation Act until September 30, 1994. Public Law 101-383 also contains provisions to amend Strategic Petroleum Reserve drawdown authorities, require a Strategic Petroleum Reserve Plan Amendment for completion of storage capacity for one billion barrels, authorize drawdown and distribution tests, and

provide for a three-year (fiscal years 1992, 1993, and 1994) test program of storage of refined petroleum products.

On November 11, 1993, the President signed into law the Department of the Interior and Related Agencies Appropriations Act, 1994 (Public Law 103-138) providing \$206,810,000 for operations and management of the Reserve. The appropriations act also includes an outlay cap of \$75,580,000 on funds in the SPR Petroleum Account.

STRATEGIC PETROLEUM RESERVE PLAN AND AMENDMENTS

Section 154 of the Energy Policy and Conservation Act required the preparation of a Strategic Petroleum Reserve Plan. The Plan, addressing the development and implementation of the Strategic Petroleum Reserve, was submitted to the Congress on February 16, 1977, and became effective on April 18, 1977.

Strategic Petroleum Reserve Plan Amendment No. 1 accelerated the planned schedule for filling the Reserve. This Amendment was submitted to the Congress on May 25, 1977, and became effective on June 20, 1977. The revised goal for 500 million barrels of crude oil in storage by December 22, 1980, advanced the original schedule by two years. Amendment No. 2 to the Strategic Petroleum Reserve Plan authorized an increase in the Strategic Petroleum Reserve size from 500 million barrels to one billion barrels. This amendment was transmitted to the Congress on May 18,

1978, and became effective on June 13, 1978. The Amendment described Department of Energy plans to store 750 million barrels of petroleum in underground storage facilities. Decisions were not made regarding the methods or timing for developing the final 250 million barrels of storage capacity.

On October 31, 1979, the Department of Energy submitted Amendment No. 3, a Distribution Plan for the Strategic Petroleum Reserve, to the Congress. In accordance with the provisions of the Energy Policy and Conservation Act in existence at that time, this Plan became effective on November 15, 1979. The Distribution Plan described the methods for drawdown and distribution of petroleum from the five existing Strategic Petroleum Reserve storage sites.

On December 1, 1982, the President transmitted Amendment No. 4, a new Drawdown Plan, to the Congress for the use of the Strategic Petroleum Reserve. This Plan, required under the Energy Emergency Preparedness Act of 1982, went into effect immediately and provides procedures for the drawdown, sale, and distribution of petroleum from the Strategic Petroleum Reserve. The Drawdown Plan replaces the Distribution Plan established by Amendment No. 3.

The Energy Policy and Conservation Act Amendments of 1990 (Public Law 101-383) required the Department to amend the Strategic Petroleum Reserve Plan to prescribe plans for completion of one billion barrels of storage capacity.

PROGRAM/PROJECT MANAGEMENT

The Strategic Petroleum Reserve Office was created under the Energy Policy and Conservation Act for the establishment, management, and maintenance of the Strategic Petroleum Reserve. The Assistant Secretary for Fossil Energy has overall programmatic responsibility for achieving the goals and objectives of the Strategic Petroleum Reserve Program. This responsibility has been delegated to the Deputy Assistant Secretary for Strategic Petroleum Reserve, Richard D. Furiga, and is exercised through offices located in Washington, D.C.

The Project Management Office is located in New Orleans, Louisiana, and is under the direction of the Project Manager, William C. Gibson, Jr. The Project Management Office carries out day-to-day project activities, including the management and operation of five oil storage sites and one marine terminal.

FIGURE 1
Program/Project Management Structure

STORAGE FACILITY DEVELOPMENT PROGRAM

DEVELOPMENT OF THE 750-MILLION BARREL STORAGE PROGRAM

The Strategic Petroleum Reserve Facilities Development Program is presently designed and constructed to provide a cumulative storage capacity of 750 million barrels and a drawdown/distribution capability of 4.5 million barrels per day.

The Department has developed five large underground crude oil storage facilities in salt domes along the Gulf Coast of Texas and Louisiana to stockpile 750 million barrels of crude oil. The five storage sites comprising the 750 million barrel program are Bayou Choctaw, Weeks Island, and West Hackberry in Louisiana, and Bryan Mound and Big Hill in Texas. These storage sites are organized into three distribution systems--the Seaway, Texoma, and Capline systems. They are connected by Department of Energy pipelines to commercial crude oil pipeline networks and to commercial and Government-owned marine terminal distribution facilities. A sixth site, Sulphur Mines, Louisiana, was decommissioned in 1992 and sold to PPG Industries, Inc., in May 1993. The locations of the current Strategic Petroleum Reserve storage sites and their distribution pipelines and terminals are shown in Figure 2.

In 1993, the Strategic Petroleum Reserve program modified its storage

plans for the two Capline storage sites. The revised plan reduces the storage capacity of the Weeks Island storage site from 73 to 70 million barrels and increases the storage capacity of the Bayou Choctaw storage site from 72 to 75 million barrels. The derating of the capacity of the Weeks Island storage site is necessary to change the site from a filled-to-capacity condition to a site which can accommodate another 15 years of capacity loss due to salt closure. The annual salt closure rate of the Weeks Island mine is approximately 150,000 barrels per year. The accompanying increase in Bayou Choctaw storage capacity is made possible by the larger than expected capacities that exist in the sweet caverns. Table 1 provides a comparison of the previous and current site storage configurations for the Strategic Petroleum Reserve.

FIGURE 2

STRATEGIC PETROLEUM RESERVE STORAGE SITES AND DISTRIBUTION SYSTEM

Table 1. Strategic Petroleum Reserve Storage Configuration

PREVIOUS PLAN				CURRENT PLAN	
STORAGE SYSTEM	STORAGE FACILITIES	STORAGE CAPACITY (MMB)	CRUDE MIX (SWEET/SOUR)	STORAGE CAPACITY (MMB)	CRUDE MIX (SWEET/SOUR)
SEAWAY	BRYAN MOUND	226	66/160	226	66/160
TEXOMA	WEST HACKBERRY	219	113/106	219	113/106
	BIG HILL	<u>160</u>	<u>69/91</u>	<u>160</u>	<u>69/91</u>
	TOTAL	379	182/197	379	182/197
CAPLINE	BAYOU CHOCTAW	72	34/38	75	37/38
	WEEKS ISLAND	<u>73</u>	<u>0/73</u>	<u>70</u>	<u>0/70</u>
	TOTAL	145	34/111	145	37/108
TOTAL		750	282/468 38%/62%	750	285/465 38%/62%

STORAGE FACILITIES STATUS

BRYAN MOUND

The Bryan Mound site is located in Brazoria County, Texas, approximately three miles southwest of Freeport. The Department acquired this storage site in 1977 and converted four existing brine caverns for oil storage, with a total capacity of 66 million barrels. Subsequently, the Department expanded this site to a capacity of 226 million barrels through the solution mining of 16 additional 10 million-barrel caverns. The expansion was completed in 1986 and oil fill is near completion.

The brine pipeline to the Gulf, which discharges the brine generated during cavern leaching and oil fill, is badly deteriorated and has leaked numerous times in recent years. The most recent leaks have occurred in February and November 1993. Patch repairs of small leaks have allowed the pipeline to be serviceable until the replacement can be completed. The condition of the brine disposal pipeline does not impact the site's ability to draw down; however, the pipeline is required for brine discharge associated with future oil fill and cavern pressure maintenance.

In 1993, the Department issued an Environmental Assessment (DOE/EA-0804) for replacing the brine disposal pipeline with a smaller (24-inch) pipeline and shortening the offshore section from 12.5 miles to 3.75 miles. The Environmental Assessment indicated that the pip-

ing plover, a threatened shorebird that winters along the Gulf Coast, does not appear to frequent the immediate vicinity of the planned project and would not likely be disturbed. The U.S. Fish and Wildlife Service concluded that construction during November through August would not adversely affect the threatened piping plover.

The contract for construction of the new brine disposal pipeline was awarded in September 1993. The contract provides for procurement, cement lining, and installation of the pipeline. The pipeline is scheduled for installation in May 1994 and is expected to be completed by September 1994.

During 1993, several major site improvement projects were completed at Bryan Mound including repainting four storage tanks, dredging the inlet to the raw water intake structure, construction of additional cable trays and duct bank systems, and installation of lightning protection and enhanced resistance grounding. In September 1993, the Department awarded a contract to add a Crude Oil Testing Laboratory to the existing environmental laboratory at Bryan Mound that will permit onsite testing of crude oil.

WEST HACKBERRY

The West Hackberry site is located in Cameron Parish, Louisiana, approximately 22 miles southwest of Lake Charles. The Department acquired this storage site in 1977 and converted five existing brine caverns for oil storage, with a capacity of 49 million barrels. Subsequently, the Department expanded

the storage site to a capacity of 219 million barrels by solution mining 17 additional 10 million-barrel storage caverns. All site development was completed in 1988, and oil fill is currently at 93 percent of capacity.

The West Hackberry brine disposal pipeline was taken out of service in 1991 due to deterioration, and brine disposal is being accomplished using existing brine disposal wells. These existing brine disposal wells were constructed in 1977 and have an extremely limited disposal capacity. In 1992, the Department initiated a program to recomplete several wells using newer disposal techniques and new injection zones. The first well was recompleted in September 1992 and achieved rates of over 60,000 barrels per day. A second well was recompleted in a shallower zone in November 1993 and achieved an initial test rate of 26,000 barrels per day, falling short of the expected 75,000-plus barrels per day disposal rate. A thorough evaluation of the recompletion technique and test results are currently in progress. A third well has been recompleted using the new technology but will not be tested until the first quarter of 1994. When properly completed, these three wells are expected to provide a site brine disposal capability of over 150,000 barrels per day and will be sufficient for near-term site oil fill operations and cavern pressure maintenance.

During 1993, the Department awarded a contract to install an environmental cap on the existing anhydrite disposal ponds and completed revegetation of the Department's pipeline easement extending from the West

Hackberry site to the Lake Charles area. Also in 1993, the Department installed additional subsidence monuments on the site to measure and track surface subsidence rates over the salt dome.

SULPHUR MINES

The Sulphur Mines storage facility was located in Calcasieu Parish, Louisiana, approximately 12 miles west of Lake Charles. The Department acquired this storage site in 1979 and converted three existing brine caverns for crude oil storage with a capacity of 26 million barrels.

Due to its operational costs and limited distribution capabilities, the Department initiated a plan in 1986 to transfer the Sulphur Mines oil to other sites and decommission and sell the site. Sulphur Mines was decommissioned in 1992 and subsequently sold to PPG Industries, Inc., in May 1993. The offsite oil and brine pipelines were later sold for reclamation in August 1993. The plugging of the remaining offsite brine disposal wells is currently in progress.

BIG HILL

The Big Hill storage site is located in Jefferson County, Texas, 20 miles southwest of Beaumont. The Department acquired this undeveloped site in 1982, and through the solution mining of 14 storage caverns, developed a storage facility with a capacity of 160 million barrels. All site development was completed in 1991. Oil fill is currently 24 percent of capacity.

The site's year-end inventory was 38.1 million barrels. Approximately 6.9 million barrels were received during 1993 via pipeline from the Naval Petroleum Reserve in California.

In May 1993, the Department contracted with the Trinity Bay Conservation District to extend the water main to the Big Hill site for a potable water supply. In September 1993, the Department awarded a contract to add a Crude Oil Testing Laboratory to the existing environmental laboratory at Big Hill. This will serve as the oil testing laboratory for both the Big Hill and West Hackberry storage sites.

BAYOU CHOCTAW

The Bayou Choctaw site is located in Iberville Parish, Louisiana, approximately 12 miles southwest of Baton Rouge. The Department acquired this storage site in 1977 and converted four existing brine caverns, with a capacity of 46 million barrels, for oil storage. Subsequently, the Department expanded the storage capacity to 75 million barrels by acquiring an existing cavern from Union Texas Petroleum and the solution mining of two additional caverns. All site development was completed in 1991. Oil fill is currently 52 million barrels.

The Bayou Choctaw storage facility uses underground injection for the disposal of brine from oil fill and cavern pressure maintenance. The brine disposal capability of the site's 12 brine disposal wells has gradually declined in recent years to approximately 92,500 barrels per day. During 1993, the Department

initiated plans for the recompletion of one of the wells to test the capability of new completion techniques to achieve greater brine disposal.

In August 1993, the Department awarded a contract to increase the maximum operating pressure of the site's crude oil header system and to modify the thermal relief system for more efficient operations.

WEEKS ISLAND

The Weeks Island site is located in Iberia Parish, Louisiana, approximately 95 miles southwest of New Orleans. The Department acquired this storage site in 1977 and converted an existing conventional salt mine to oil storage with a capacity of 70 million barrels. Development and oil fill of this site was completed in 1982.

In 1987, the Department initiated a mine integrity assurance program to enhance the mine's safety and security against any surface water intrusion. This program consists of: (a) installation of an air dryer system to reduce water vapor condensation in the shafts and manways of the mine above the oil chamber and to provide for early detection of water leaks; (b) isolation of the Morton International Inc., Markel Mine from the Strategic Petroleum Reserve's operations area by constructing new bulkheads; (c) installation of a backup or alternate drawdown capability to the existing 11-pump system, located at the base of the service shaft; and (d) upgrading of existing bulkheads as required to meet potential hydrostatic pressures.

In 1993, the Department completed the final projects of the Weeks Island Integrity Assurance Program. During 1992, the Department constructed two new isolation bulkheads to segregate the Morton Markel Mine from the Department's underground facilities and equipment. In 1993, water detection equipment was installed on the Morton's side of the bulkhead. With this water detection equipment, the access doors in the isolation bulkheads can be safely opened to permit direct visual inspection of the Markel Mine if required. Also in 1993, the Department completed upgrades to the service shaft bulkheads and two raisbore bulkheads to enhance the integrity of these bulkheads against potential water damage.

The production shaft hoist building at the Weeks Island site is extremely deteriorated due to age and the surrounding salt environment. In September 1993, the Department awarded a contract to rebuild the existing production shaft hoist building in the same location. Construction is scheduled to be completed by the end of 1994.

In May 1992, a sinkhole was discovered east of the service shaft on the south side of the Weeks Island salt dome. During 1993, the Department and Sandia National Laboratories initiated preliminary geotechnical studies into the nature of the sinkhole and analogous conditions on adjacent salt domes. The Weeks Island sinkhole is estimated to expand by approximately 20 cubic yards per month. At present, there is no explanation for the lost material and there is no evidence of any communication with the Weeks Island storage chamber.

However, in 1994, the Department and Sandia National Laboratories plan to conduct further tests and investigations to assure the integrity of the Strategic Petroleum Reserve storage facility.

STORAGE FACILITIES LIFE EXTENSION PROGRAM

The Strategic Petroleum Reserve's storage facilities were originally designed for an operational life of 20 years. Construction at four sites, Bryan Mound, West Hackberry, Bayou Choctaw, and Weeks Island, was completed in the early 1980s. Most of these systems will reach the end of their design life around the year 2000. Many of the systems and equipment at these sites (i.e., raw water, brine disposal, electrical, and instrumentation) are experiencing an increasing number of failures and increasing maintenance costs normally associated with the later stages of design life.

During 1993, the Department initiated a Life Extension Program to ensure that the Strategic Petroleum Reserve can continue to meet its mission readiness and system availability through the year 2025.

The Mitre Corporation, which provides Systems Engineering Support to the Strategic Petroleum Reserve, is developing a Comprehensive Life Extension Plan for replacing and modernizing all of the mechanical, civil, electrical, and instrumentation systems that are nearing the end of their operational lives. During 1993, Mitre performed site characterizations and life

expectancy assessments of all of the storage facilities. During the last quarter of 1993, Mitre initiated the development of a Life Extension Master Plan that focuses on the simplification of site configurations and the standardization of systems and equipment for all of the sites. This master plan is expected to yield benefits and cost savings in operations, maintenance, and logistics.

The Comprehensive Life Extension Plan is scheduled for completion in May 1994. Implementation will be phased in over a six year period, beginning in 1994. Projects planned for 1994 include modernization of the control room systems at West Hackberry, Weeks Island, and St. James and the installation of heat exchangers for crude oil cooling at Bryan Mound, West Hackberry, and Bayou Choctaw.

PLANNING FOR 250-MILLION BARREL EXPANSION

STRATEGIC PETROLEUM RESERVE EXPANSION PLANNING

The Energy Policy and Conservation Act Amendments of 1990 (Public Law 101-383) directed the Department of Energy to submit a Strategic Petroleum Reserve Plan Amendment to Congress by September 15, 1992, containing detailed plans for the expansion of the storage facilities of the Reserve to one billion barrels.

During 1991, the Department submitted a report to Congress that identified eight potential sites for

expansion of the Reserve. This list was subsequently narrowed to two sites in Texas and two sites in Louisiana; another potential site in Mississippi was added in December 1991. Only two of these sites will be selected for development.

During 1992, the Department issued a Draft Environmental Impact Statement for five potential sites: Big Hill and Stratton Ridge in Texas, Weeks Island and Cote Blanche in Louisiana, and Richton in Mississippi. All of the sites were addressed equally, with no preferred alternative stated.

Public hearings were held in December 1992. The comment period closed March 8, 1993. In January 1993, comments were received requesting the consideration of an alternative means of brine disposal. To consider reasonable new alternatives, the Department issued a Supplement to the Draft Environmental Impact Statement on June 4, 1993, for Richton, Mississippi, and Cote Blanche, Louisiana. Public hearings on the Supplement were held in Hattiesburg, Mississippi, and Franklin, Louisiana, in July, 1993. The comment period closed on July 26, 1993.

At this time, the site selection process and prior plans for issuing a Strategic Petroleum Reserve Plan Amendment by April 1994 have been suspended pending departmental policy decisions. The ultimate size of the Reserve is currently under departmental review and will be addressed with the Congress in the forthcoming Energy Policy and Conservation Act reauthorization process.

OIL ACQUISITION AND FILL STATISTICS FOR THE FOURTH QUARTER 1993

The Strategic Petroleum Reserve was filled at an average rate of 15,452 barrels per day during the calendar quarter ending December 31, 1993, and the crude oil inventory was 587,079,998 barrels. Table 2 summarizes the Reserve's crude oil inventory and delivery statistics as of December 31, 1993, and includes projections for calendar year 1994.

During the period October 1 through December 31, 1993, only low sulfur (sweet) crude oil was delivered to the Strategic Petroleum Reserve. The weighted average price per barrel of the crude oil delivered to the Reserve during the fourth quarter was \$18.11, including costs for transportation, but excluding costs for customs duties, Superfund taxes, terminal services, and administration.

OIL FILL, CALENDAR YEAR 1993

During 1993, the Strategic Petroleum Reserve crude oil inventory was increased by 12.3 million barrels, representing an average annual fill rate of approximately 34,000 barrels per day. This fill rate was just slightly less than the 36,000 barrel per day fill rate projected in the Reserve's annual report for 1992. Fiscal and calendar year-end inventories and average daily fill rates since 1977 are presented in Table 3. Strategic Petroleum Reserve crude oil fill

is illustrated on both an annual and cumulative basis in Figures 3 and 4, respectively.

OIL ACQUISITION, CALENDAR YEAR 1993

During 1993, approximately 12.3 million barrels of crude oil were acquired and delivered to the Strategic Petroleum Reserve. Of this quantity, about 7 million barrels were received from the Naval Petroleum Reserve No. 1 in California (NPR-1). Pursuant to the Naval Petroleum Reserve Production Act of 1976 (10 U.S.C. 7430(b)(2)) in effect during fiscal year 1993, the Secretary could not sell NPR crude oil at a price less than the higher of 90 percent of the current sales price of comparable petroleum in the same area or the price of oil being purchased for the Strategic Petroleum Reserve minus the cost of transporting oil from the NPR to the Strategic Petroleum Reserve. In May 1992, the Department determined that some of the bid prices for NPR oil did not meet the test, and transfer of NPR crude oil to the Strategic Petroleum Reserve was initiated on June 1, 1992. These deliveries continued through 1993 and were shipped from California through a network of five commercial pipeline systems to the Sun Terminal in Nederland, Texas, for storage at Big Hill and West Hackberry at a rate of approximately 20,000 barrels per day.

The total quantity received by this means during 1992 and 1993 was 9,556,907 barrels. Additionally, as of December 31, 1993, there were 184,000 barrels remaining in the pipeline system for delivery during January 1994.

The balance of the crude oil delivered to the Strategic Petroleum Reserve during 1993 (5.3 million barrels) was acquired under five contracts awarded by the Department of Defense Defense Fuel Supply Center, acting as the Department of Energy purchasing agent under an interagency agreement. The oil was purchased under an open continuous solicitation for competitive offers which were received and evaluated on a periodic basis. This method will be used for purchasing additional crude oil for the Reserve during 1994.

Table 4 shows the crude oil quantities received since the inception of the Strategic Petroleum Reserve program through 1993 by country of origin. Of the total oil in storage, 66.3 percent is high sulfur (sour) and 33.7 percent is low sulfur (sweet). Table 5 provides information on the location of this inventory by storage site. The quality specifications used when acquiring Strategic Petroleum Reserve crude oil can be found in Appendix B of this report.

necessary and practicable to assure that at least 50 percent of their cargo transported on ocean vessels in a calendar year is transported by privately-owned U.S.-flag vessels, to the extent they are available at fair and reasonable rates. By agreement between the Department of Energy and the Department of Transportation, the Strategic Petroleum Reserve's Cargo Preference Act compliance is measured in long-ton miles; i.e., cargo tons multiplied by the distances transported.

During 1993, two U.S.-flag vessels, transporting a total of 3 million barrels, were involved in delivering crude oil to the Strategic Petroleum Reserve. These deliveries equaled 1.9 billion long-ton miles, or 47.4 percent of the total long-ton miles involved in marine deliveries to the Reserve.

This slightly less than 50 percent usage of U.S.-flag vessels was caused by the different cargo capacities of available vessels not allowing U.S.-flag and foreign-flag vessels to transport equal amounts of the contracted crude oil supplies for the same distance.

CARGO PREFERENCE COMPLIANCE

The Cargo Preference Act of 1954 (Public Law 83-664) requires Federal agencies to take such steps as may be

TABLE 2
STRATEGIC PETROLEUM RESERVE OIL INVENTORY
AND DELIVERY STATISTICS
1993 INVENTORY AND DELIVERY SUMMARY
(BARRELS)

Calendar Year 1993	Average Daily Fill Rate	Quarter Oil Receipts	Ending Oil Inventory
1st Quarter	32,079	2,887,110	577,611,138
2nd Quarter	56,507	5,142,150	582,753,288
3rd Quarter	31,577	2,905,086	585,658,374
4th Quarter	15,452	1,421,624	587,079,998
TOTAL	33,852	12,355,970	587,079,998
Amount of Oil in Transit (December 31, 1993)*			184,155

* NPR-1 oil en route via pipeline.

1994 INVENTORY AND DELIVERY PROJECTIONS*

Calendar Year 1994	Average Daily Fill Rate	Quarter Oil Receipts
1st Quarter	28,000	2,500,000
2nd Quarter	16,500	1,500,000
3rd Quarter	0	0
4th Quarter	0	0
TOTAL	11,500	4,000,000

* Based on anticipated contract awards, crude oil prices and FY 1995 budget assumptions.

TABLE 3
STRATEGIC PETROLEUM RESERVE OIL FILL HISTORY

	Fiscal Year		Calendar Year	
	Year-End Inventory (million bbls)	Average Daily Fill Rate (thousand bbls/d)	Year-End Inventory (million bbls)	Average Daily Fill Rate (thousand bbls/d)
1977	1.1	3	7.2	20
1978	49.1	131	68.5	168
1979	91.2	115	91.7	64
1980	92.8	4	107.8	44
1981	199.2	292	230.3	336
1982	277.9	215	293.8	174
1983	361.0	228	379.1	234
1984	431.1	191	450.5	195
1985	489.3	159	493.3	119*
1986	506.4	47*	511.6	51*
1987	533.9	75	540.6	80
1988	554.7	57	559.5	52
1989	577.1	62	579.9	56
1990	589.6	34	585.7	27*
1991	568.5	**	568.5	**
1992	571.4	8	574.7	17
1993	585.7	39	587.1	34
* Fill rates unadjusted for oil deliveries under the 1985/86 and 1990 test sales.				
** Fill was suspended during both fiscal and calendar year 1991; a decrease in inventory resulted from drawdown in early calendar year 1991.				

Figure 3

ANNUAL STRATEGIC PETROLEUM RESERVE OIL FILL

Figure 4

CUMULATIVE STRATEGIC PETROLEUM RESERVE OIL FILL

TABLE 4
CRUDE OIL RECEIVED THROUGH 1993
(MILLION BARRELS)

Source Country	1993	Cumulative	Percent of Total
Mexico		256.7	42.1
United Kingdom	3.0	143.8	23.6
United States:		48.0	7.9
Alaska		31.4	5.2
Other*	6.9	16.6	2.7
Saudi Arabia		27.1	4.4
Libya		23.7	3.9
Iran		20.0	3.3
United Arab Emirates		18.4	3.0
Nigeria		15.1	2.5
Norway	1.0	11.9	2.0
Oman		9.0	1.5
Egypt		8.9	1.5
Ecuador		6.2	1.0
Algeria		6.2	1.0
Cameroon		3.4	0.6
Iraq		3.4	0.6
Gabon		2.4	0.4
Qatar		2.3	0.4
Angola	1.0	1.0	0.2
Venezuela		0.9	0.1
Peru		0.4	0.1
Argentina	0.4	0.4	0.1
TOTAL RECEIPTS**	12.3	609.1	100.0

* Includes shipments from Naval Petroleum Reserves

** Unadjusted for deliveries during 1985/1986 and 1990 test sales and 1991 drawdown and for operational gains and losses.

TABLE 5
STRATEGIC PETROLEUM RESERVE CRUDE OIL INVENTORY

AS OF DECEMBER 31, 1993
(MILLION BARRELS)

Storage Site	Location	1993 Cumulative Total			Total End of Year 1992
		Sour*	Sweet**	Total	
Bryan Mound	Brazoria County, TX	155.5	61.7	217.2	216.8
Big Hill	Jefferson County, TX	25.0	13.1	38.1	26.9
West Hackberry	Cameron Parish, LA	100.0	104.5	204.5	204.5
Bayou Choctaw	Iberville Parish, LA	35.1	17.1	52.2	50.8
Weeks Island	Iberia Parish, LA	71.9	0.0	71.8	71.8
SUBTOTAL		387.4	196.4	583.8	571.0
Tanks and Pipelines		1.7	1.6	3.3	3.7
TOTAL		389.0	198.1	587.1	574.7
* Sulphur content greater than 0.5 percent. ** Sulphur content not exceeding 0.5 percent.					

REPORT ON THE REFINED PETROLEUM PRODUCT RESERVE TEST

Section 160(g) of the Energy Policy and Conservation Act Amendments of 1990 (Public Law 101-383), requires that the Secretary of Energy implement a three year refined petroleum product reserve test program in each of fiscal years 1992, 1993, and 1994 and transmit a report evaluating the mechanisms demonstrated, other potential mechanisms, and the purchase of facilities, including an assessment of the costs and benefits of the various mechanisms. The report is also required to contain recommendations on future regional petroleum product reserves.

The legislation further provides in part, that during the test the Department shall store refined petroleum products in leased storage facilities, and the amount of petroleum acquired should be increased by an amount equal to ten percent of Strategic Petroleum Reserve fill during each fiscal year. However, no more than ten percent of appropriations for the SPR Petroleum Account in each fiscal year could be used to purchase the products

Subsequently, the Department of the Interior and Related Agencies Appropriations Act for FY 1994 (Public Law 103-138) provides that the requirements of Section 160(g) shall not apply during fiscal year 1994. Therefore, while the report specified by the 1990 legislation is not required in fiscal year 1994, the Department is nevertheless including this section for informational purposes.

Department of Energy staff began planning for the reserve test in 1991, but in fiscal year 1992 the net appropriation to the SPR Petroleum Account was \$15 million. Because the authorizing legislation limits purchases of petroleum for the test to ten percent of the appropriation to the SPR Petroleum Account during each fiscal year, the limit of product purchases was \$1.5 million. Since that amount of money would have been inadequate to purchase more than a token volume of products, the Department determined that it would not be appropriate to initiate the test with such a small volume of product. In fiscal years 1993 and 1994, no additional appropriations were earmarked to the SPR Petroleum Account. For these reasons, the Department has withheld the conduct of the refined petroleum product reserve test.

While Section 160(d) requires a report that includes assessments of other mechanisms the law to mean, the Department of Energy interprets that the report was intended to be a comparative assessment of mechanisms relative to those tested. Absent the test, it does not appear appropriate to make the comparisons envisioned the requirement for a report requirement.

The requirement under Section (160(g) calls for recommendations of the Department regarding future refined petroleum product storage. The Department notes that section 157 of the Energy Policy and Conservation Act

(Public Law 94-163) already requires a Regional Petroleum Reserve component of the Strategic Petroleum Reserve. Regions which import more than 20 percent of the residual fuel oil or any refined product consumed over a 24-month-period may qualify for such a Regional Petroleum Reserve.

Section 157 permits the Secretary to substitute crude oil for such other products and to store the oil in a reserve "readily accessible to" rather than actually located in such regions. Section 154(d) of the Act also requires that the Strategic Petroleum Reserve Plan be designed to assure, to the maximum extent practicable, that each noncontiguous area of the United States that does not have overland access to domestic crude oil production has its component of the Strategic Petroleum Reserve within its respective territory.

Pursuant to the authority provided, the Strategic Petroleum Reserve Plan substituted crude oil for residual fuel oil and refined petroleum products. The Department also determined that Strategic Petroleum Reserve storage sites in the Gulf Coast area are accessible to all regional petroleum reserve-qualifying regions and that storage in non-contiguous areas is not practicable.

On an annual basis the Department has recomputed the regions of the country qualifying for the regional petroleum reserve. We have also conducted studies of the feasibility of large refined product reserves, and responded to congressional requests for consideration of storage in regions and insular areas. In all of our examinations,

we have concluded that regional and refined product storage would increase costs and reduce flexibility compared to crude oil storage in the Gulf Coast area. Without specific new evidence in support of our conclusion, the Department of Energy recommends against storage of refined products or in storage of any product regional areas.

OTHER PROJECT ACTIVITIES

OIL STABILIZATION PROGRAM

In 1993, the Department progressed in quantifying and planning corrective action on two related but distinct problems that, although correctable, have temporarily reduced the availability of some of the oil inventory for drawdown in the near-term. These problems are:

(1) A higher-than-normal gas content in some of the crude oil apparently from years of intrusion of methane from the surrounding salt formation. During a drawdown, this "gassy" oil will boil at atmospheric pressure. As the gases evolve, they will strip other hydrocarbons from the crude oil, with the resultant emissions significantly exceeding present air quality permit limits.

(2) Elevated temperatures of some of the crude oil, due to geothermal heating that has increased the vapor pressure of the oil. This higher than usual vapor pressure could result in excessive emission of volatile organic compounds and hazardous air pollutants causing contractual and regulatory limits to be exceeded.

Together, these phenomena have temporarily reduced the amount of crude oil available for drawdown to 520 million

barrels at a rate of 2.0 million barrels per day.

To assess the extent to which gas intrusion is impacting the availability of oil for drawdown, pilot plant testing and gas analyses have been completed on the inventory in twelve Strategic Petroleum Reserve caverns. Testing of the inventory in an additional 26 caverns is underway and should be completed by April 1994. Data from these and other tests will be used in designing a plant to stabilize the crude oil. Conceptual design of an oil stabilization plant is underway. Current plans are to degas approximately 200 million barrels of crude oil using two 100 thousand barrel per day plants and blending this degassed oil with gassy oil at the time of drawdown. All Strategic Petroleum Reserve inventory should be available for drawdown after December 1997.

To mitigate the effects of geothermal heating of the crude oil in the near term, drawdown and distribution scenarios based on pipeline cooling, cavern selection, and flow rate have been developed. Heat exchangers will be constructed initially at Bryan Mound, West Hackberry and Bayou Choctaw, and ultimately at Big Hill as a long-term means of cooling the crude oil and reducing its vapor pressure to below regulatory limits. The conceptual design for these heat exchangers has been completed and detailed design is underway. Construction is scheduled for completion in March 1995.

A National Environmental Policy Act review determined that cooling the oil will have no significant environmental effects, and neither an Environmental Assessment nor an Environmental Impact Statement is required. An Environmental Assessment on stabilizing crude oil impacted by the presence of excessive gases is being prepared by the Department.

PROCUREMENT AND CONTRACTOR SUPPORT

Obligations in fiscal year 1993 for Strategic Petroleum Reserve procurement Voted approximately \$445.9 million. Obligations for ongoing Strategic Petroleum Reserve operations, maintenance, and management totaled \$192.5 million, and a further \$253.4 was obligated for the acquisition of crude oil during fiscal year 1993.

DynMcDermott Petroleum Operations Company provided management and operating services and Tucker and Associates, Inc., provided technical management and support services.

Other prime contractors who provided services to the Strategic Petroleum Reserve during fiscal year 1993 included: Fluor Daniels, Inc., and Jacobs Engineering Group for architect-engineering services; Mitre Corp. for Engineering Support Services; ARCO Pipe Line Company, Phillips 66 Company, Sun Pipe Line Company, and Sun Marine Terminals for transportation and terminalling services; Kaugh &

Jones Electric Company, Miners, Inc., Foley Company, Surface Prep & Coating Enterprises, Plaquemine Contracting Services, and Atlantic Electric Service Construction, Inc., for construction; and Timco Electric, Vindicator Corporation, and MIS Inc., for hardware.

On November 22, 1993, the Department of Energy announced the selection of Walk, Haydel & Associates to provide architect-engineering services to the Strategic Petroleum Reserve. Pending negotiations, a contract award is projected for March 1994. This contract would replace the current architect-engineer support contract with Fluor Daniels, Inc., which is due to expire in April 1994.

REAL ESTATE

On May 7, 1993, the Strategic Petroleum Reserve sold 460 fee-owned acres associated with the Sulphur Mines facility to PPG Industries Inc., for \$400,000 by quitclaim deed. On August 25, 1993, another 108 easement acres were sold to Lancer Resources Company for \$56,000. Lancer removed portions of the crude oil and brine pipelines and agreed to plug and abandon the four Sulphur Mines disposal wells on the 68 fee-owned acre tract as part of the quitclaim deed.

On December 28, 1993, Morton International issued the Department of Energy a right of entry for construction on the Weeks Island sinkhole project.

The Department entered into three

The Department entered into three permits with the Louisiana (signed June 29, 1993) and Texas (signed November 1, 1993) Commissions for the Blind to operate vending facilities at the Strategic Petroleum Reserve Project Management Office and six other Strategic Petroleum Reserve sites in accordance with the Randolph-Sheppard Act, amendment of 1974 Public Law 93-516.

SECURITY

DynMcDermott Petroleum Operations Company, under its management and operating contract, is assigned responsibility to implement and administer the Department of Energy's Strategic Petroleum Reserve Security Program. DynMcDermott secures protection services through a subcontract with Wackenhut Services, International. The Strategic Petroleum Reserve currently has a protection force of 228 armed officers.

Due to recent changes in the world political climate, the Strategic Petroleum Reserve conducted a vulnerability assessment of its facilities in 1992 with the assistance of the Department's Office of Safeguards and Security and Pacific Northwest Laboratory. The assessment recommended several cost-effective modifications to the Strategic Petroleum Reserve's security program, and these are reflected in a revised Security Plan approved in December 1993. The Strategic Petroleum Reserve Security Plan defines the appropriate level of security necessary to provide reasonable assurance for protection of personnel and facilities against hostile acts.

RECOVERY PROGRAM

The Strategic Petroleum Reserve Recovery Program is designed to provide for the restoration of operational drawdown capabilities within 15 days for one site and within 30 days for multiple sites after a natural disaster or other disabling event.

Procurement of all systems and equipment for the recovery program have been completed and system tests were successfully performed at three sites over the last two years:

Weeks Island, September 1992
Bayou Choctaw, December 1992
West Hackberry, November 1993

The West Hackberry test demonstrated that the recovery system can withdraw crude oil from underground storage and deliver it to a terminal at the rate of 1.25 million barrels per day. Under an Interagency Agreement, the U.S. Army Corps of Engineers provided water to the storage site by barge-mounted pumping systems.

ALTERNATIVE FUEL VEHICLE PROGRAM

The Strategic Petroleum Reserve maintains a total fleet of approximately 250 vehicles. As part of the Department's implementation of the alternative fuel provisions of the Energy Policy Act of 1992, the Strategic Petroleum Reserve has placed eight alternatively fueled vehicles in service over the past two years. In 1992, the Strategic Petroleum Reserve acquired five sedans using methanol-85 fuel to replace

five vehicles using conventional unleaded gas. Use of alternative fuel vehicles, although embryonic, reduces undesirable exhaust emissions.

The Strategic Petroleum Reserve has plans to increase annually the number of alternatively fueled vehicles and ultimately replace over half of the Reserve's vehicle fleet by 1999. Under current schedules developed in cooperation with the General Services Administration, which furnishes 80

percent of the vehicles on the Strategic Petroleum Reserve sites, the Reserve will place into service a total of 44 methanol and 88 compressed natural gas powered vehicles at its seven Louisiana and Texas locations by 1999. The General Services Administration and the Department of Energy have a joint responsibility to implement the alternatively fueled vehicle program across the Nation.

ENVIRONMENT, SAFETY AND HEALTH

ENVIRONMENTAL COMPLIANCE

The Department approved the Environmental Assessment of the Brine Pipeline Replacement for the Bryan Mound facility and issued a Finding of No Significant Impact in May 1993 (DOE/EA-0804). The Environmental Protection Agency has approved relocating the brine diffuser to a point about 3.5 miles offshore in the Gulf of Mexico in 38 feet of water. Based on the findings in the Environmental Assessment, the U.S. Fish and Wildlife Service has determined that construction may proceed in the months of November 1993 through August 1994 without adversely affecting the piping plover, a threatened shore bird.

The new management and operating contractor and the Department co-signed the renewal applications for the National Pollutant Discharge Elimination System permits for all of the facilities in the Strategic Petroleum Reserve. This satisfies a previous agreement with the Environmental Protection Agency which has a policy requiring operating contractors at governmental facilities to share responsibility for compliance with permit conditions. The Environmental Protection Agency has advised that the permit applications are administratively complete. Permit issuance is pending.

During 1993, the Strategic Petroleum Reserve re-evaluated the

implications of existing air permit limitations for emissions during a full-scale drawdown in view of recent findings of excess gas in the oil. After consulting with the Environmental Protection Agency and the air quality agencies in Texas and Louisiana, the Department submitted an application to amend the air permit for Bryan Mound to allow the emissions that would now be expected during a drawdown. Similarly, the Department will submit applications in 1994 to amend the air permits for West Hackberry, Bayou Choctaw, and Big Hill. Air permits for St. James and Weeks Island were amended in 1992 and 1993, respectively, and require no further action. Terminals that would receive crude oil from the Reserve during a drawdown have been notified of the estimated air emissions that would be expected with the recommendation that they review their respective air permits.

OTHER ENVIRONMENTAL, SAFETY AND HEALTH ACTIONS

TIGER TEAM ES&H ASSESSMENT

A Department of Energy Tiger Team Environment, Safety and Health (ES&H) Assessment was conducted at the Strategic Petroleum Reserve in the spring of 1992. A Corrective Action Plan was approved in December 1992. All but one of the 218 findings of Occupational Safety and Health non-compliances are complete. The last outstanding of these actions, the construction of a seven-mile water line to provide Big Hill with potable municipal water, is nearly

complete. The Department has also completed action on 101 of the 250 other findings. The remainder are being re-baselined to achieve the greatest risk reduction at the least cost. The Rebased Corrective Action Plan will be completed in 1994.

During 1993, there were no accidents that involved the convening of a Type A or Type B Accident Investigation Board.

BUDGET AND FINANCE

APPROPRIATIONS

A total of \$20.9 billion has been appropriated for the Strategic Petroleum Reserve through fiscal year 1994. Included in this total are the distribution of annual and total appropriations as shown in Table 6. Figures 5 and 6 illustrate annual and cumulative appropriations for storage facilities operations and management and petroleum acquisition and transportation.

MAJOR BUDGET AND FINANCING ACTIONS DURING 1993

The budget request for the Strategic Petroleum Reserve for fiscal year 1994 was initially \$173.1 million for continued operation and management. The Department also presented information regarding two problems which, although correctable, reduced the availability of some of the oil inventory for drawdown. These problems included a higher-than-normal gas content in some of the crude oil from intrusion of methane gas from the surrounding salt formations, absorption of nitrogen used in cavern integrity pressure tests, and elevated temperatures of some of the crude oil due to geothermal heating. After reducing the initial request by \$.4 million to reflect savings from a one year freeze of the operating contractor's pay scale, Congress added \$34.1 million to the fiscal year 1993 budget to continue to remedy these problems.

On November 11, 1993, the President signed into law the Department of Interior and Related Agencies Appropriations Act, 1994 (Public Law 103-138) providing \$206.8 million for operations and management of the Reserve. The appropriations act also included an outlay cap of \$75.6 million on the use of prior year balances in the SPR Petroleum Account, excluding balances remaining from the fiscal year 1993 transfer from the Department of Defense. Total funds remaining available for obligation in the SPR Petroleum Account at the end of fiscal year 1993 are \$398 million from Department of Energy appropriations and sales and \$6 million remaining from the fiscal year 1993 transfer from the Department of Defense.

STRATEGIC PETROLEUM RESERVE ACCOUNT TRANSACTIONS, LAST QUARTER OF 1993 (FIRST QUARTER OF FISCAL YEAR 1994)

The Strategic Petroleum Reserve Account funds the development, operation, and maintenance of Reserve facilities; the salaries and expenses necessary to plan and manage the program, including the operation of the Project Management Office in New Orleans, Louisiana; and the activities pertinent to major issues concerning the development and use of the Strategic Petroleum Reserve.

A total of \$38.7 million of the Strategic Petroleum Reserve Account funds remained available for obligation at the end of fiscal year 1993.

FIGURE 5
STRATEGIC PETROLEUM RESERVE ANNUAL FUNDING

FIGURE 6
STRATEGIC PETROLEUM RESERVE CUMULATIVE FUNDING

TABLE 6
Strategic Petroleum Reserve Appropriations
(thousands of dollars)

Fiscal Year	Petroleum Acquisition and Transportation	Storage Facilities Development and Operations	Management ¹	Total
1976	\$ 0	\$ 300,000	\$ 13,975	\$ 313,975
1977	440,000	0	7,824	447,824
1978	2,703,469	463,933	14,704	3,182,106
1979	2,885,670	103,290	18,111	3,007,071
Reprogramming	<u>-529,214</u>	<u>529,214</u>	<u>0</u>	<u>0</u>
	2,356,456	632,504	18,111	3,007,071
1980	-2,000,000 ²	0	0	-2,000,000
Reprogrammings:				
Number 1	-20,391	0	20,391	0
Number 2	<u>-1,881</u>	<u>0</u>	<u>1,881</u>	<u>0</u>
	-2,022,272	0	22,272	-2,000,000
1981	2,688,282 ³	82,834	19,391	2,790,507
Entitlements	542,146	0	0	542,146
Reprogrammings:				
Number 1	-18,000	18,000	0	0
Number 2	<u>-7,334</u>	<u>7,334</u>	<u>0</u>	<u>0</u>
	3,205,094	108,168	19,391	3,332,653
1982	3,684,000	171,356	20,076	3,875,432
Reprogramming	<u>-4,300</u>	<u>4,300</u>	<u>0</u>	<u>0</u>
	3,679,700	175,656	20,076	3,875,432
1983	2,074,060	222,528	19,590	2,316,178
1984	650,000	142,357	16,413	808,770
1985	2,049,550	441,300 ⁴	17,890 ⁴	2,508,740
1986	0	94,015	13,518	107,533
Reprogramming	<u>-12,964</u>	<u>12,964</u>	<u>0</u>	<u>0</u>
	-12,964	106,979	13,518	107,533
1987	0	134,021	13,412	147,433
1988	438,744	151,886	12,276	602,906
1989	242,000	160,021	13,400	415,421
1990	371,916 ⁵	179,530	12,953	564,399
1991	566,318 ⁶	187,728	12,846	766,892
1992	88,413 ⁷	171,678	13,384	273,475
1993	-125,625 ⁸	161,940 ⁸	14,227	50,542
DOD Transfer (non add)	124,925 ⁹	700 ⁹	0	125,625 ⁹
1994	0	191,035	15,775	206,810
TOTAL	\$16,704,859 ⁹	3,931,264 ⁹	292,037	20,928,160 ⁹

¹ Excludes funds appropriated to other DOE accounts but used to finance aspects of Strategic Petroleum Reserve program management.

² Rescission.

³ Included supplemental appropriations of \$1,305,000,000.

⁴ Included in FY 1984 second supplemental appropriations.

⁵ Includes indefinite appropriation for excess NPR receipts of \$56,050,529.

⁶ Includes \$122,680,683 proceeds from the Test Sale carried out in the Fall of 1990,

proceeds from the Desert Storm drawdown of \$315,424,985 and \$19,755,064 in FY 1991 excess NPR receipts plus the FY 1991 advance appropriation of \$108,457,000.

⁷ Net of an FY 1992 advance appropriation of \$196,188,000 and the FY 1992 appropriation of \$14,910,000 less the \$122,685,000 transferred to the Strategic Petroleum Reserve appropriation (89X0218.91).

⁸ Transferred \$125,625 from the SPR Petroleum Account to the Strategic Petroleum Reserve Account.

⁹ DOD transferred a total of \$125,625,000 to DOE for oil acquisition and storage costs for the DOD-Strategic Petroleum Reserve. Neither the oil acquired nor the cost of acquisition or storage is counted in the total of Strategic Petroleum Reserve inventory or appropriations.

The appropriation for fiscal year 1994 increased available funds by \$206.8 million to a total of \$245.4 million. Of this total, \$40.5 million was obligated in the quarter ended December 31, 1993 (first quarter of fiscal year 1994), leaving a balance of \$204.9 million available for future obligation.

SPR PETROLEUM ACCOUNT TRANSACTIONS, LAST QUARTER OF 1993 (FIRST QUARTER OF FISCAL YEAR 1994)

The SPR Petroleum Account funds the acquisition of oil for the Strategic Petroleum Reserve; the associated costs for transportation and terminalling, U.S Customs duties, Superfund and Oil Spill Liability Trust Fund taxes, and other miscellaneous costs, such as Defense Fuel Supply Center administration costs associated with acquiring and transporting oil. In the event of a drawdown and sale of Strategic Petroleum Reserve oil, the SPR Petroleum Account also funds the costs of withdrawing oil from the storage caverns and transporting it to the point where the purchasers take title. An amount equal to Federal receipts from a drawdown and sale is deposited in the SPR Petroleum Account and creates additional budget authority for refilling the Reserve.

At the end of fiscal year 1993, \$404 million remained available for obligation in the SPR Petroleum Account. Outlays (payments) from the account during the fiscal year were \$137 million for oil acquisition and \$115 million for the Department of Defense inventory. No new funds were appropriated for the SPR Petroleum Account for fiscal year 1994.

During the quarter ending December 31, 1993 (first quarter of fiscal year 1994), \$62.2 million was obligated and outlays (payments) from the account during the quarter were \$4.8 million.

OIL COSTS THROUGH FISCAL YEAR 1993

During fiscal year 1993, 6.2 million barrels were acquired for the Strategic Petroleum Reserve and 6.5 million barrels were acquired for the Department of Defense inventory. Cumulative cost for the oil in the Strategic Petroleum Reserve at the end of fiscal year 1993 was \$15.9 billion for an average cost of approximately \$27.31 per barrel. Cumulative oil cost for the Department of Defense inventory at the end of fiscal year 1993 was \$115 million for an average cost of \$19.35 per barrel. A total of 1.6 million barrels of oil acquired during fiscal year 1993 were in transit and scheduled for delivery during the first quarter of fiscal year 1994.

ESTIMATED COST TO COMPLETE FILL OF THE 750 MILLION BARREL STRATEGIC PETROLEUM RESERVE

The cost to complete fill from the planned level of 592 million barrels at the end of fiscal year 1994, including the Department Defense inventory to the storage capacity of 750 million barrels, will depend on acquisition approach, price, and timing. At \$20 per barrel, acquisition of 158 million barrels could cost \$3.2 billion. At 25,000 barrels per day, fill would be completed by the year 2011; at 50,000 barrels per day, fill would be completed by the year 2002; at 100,000 barrels per day, fill would be completed by 1998.

DRAWDOWN AND DISTRIBUTION

DISTRIBUTION PLAN

In the event of a drawdown to respond to a severe energy supply interruption, or to meet obligations of the United States under the Agreement on an International Energy Program, the current plan for distributing crude oil is provided in the "Strategic Petroleum Reserve Drawdown (Distribution) Plan," Amendment Number 4 to the Strategic Petroleum Reserve Plan, submitted on December 1, 1982. The Strategic Petroleum Reserve Distribution Plan provides that, pursuant to the President's decision to use the Strategic Petroleum Reserve, the principal method of distributing Strategic Petroleum Reserve oil will be by price competitive sale. The oil will be sold and delivered to those offering the highest prices. The sale is open to the largest possible universe of eligible buyers to ensure efficient distribution of Strategic Petroleum Reserve oil. The plan also provides that, in any calendar month, the Secretary of Energy may direct the distribution of up to 10 percent of the volume of oil sold in that calendar month. The price for such oil will be the average price of Strategic Petroleum Reserve oil sold at the contemporaneous competitive sale or at the most recent competitive sale if no contemporaneous competitive sale is held.

COMPETITIVE SALES PROCEDURES

Appendix A to the Department of Energy's final rule (10 CFR Part 625) governing price competitive sales of petroleum from the Strategic Petroleum Reserve provides for Standard Sales Provisions containing or describing contract clauses, terms and conditions of sale, and performance and financial responsibility measures, which may be applicable to a particular sale of Strategic Petroleum Reserve oil. The most recent edition of the Standard Sales Provisions was published in the *Federal Register* on December 11, 1992.

Under the Standard Sales Provisions, the Strategic Petroleum Reserve sales process begins with the issuance of a Notice of Sale specifying the amount, characteristics, and location of the petroleum being sold as well as the delivery dates and the procedures for submitting offers and other information pertinent to a particular sale. In addition, the Notice of Sale specifies which sales provisions and performance and financial responsibility measures apply.

During the course of a Strategic Petroleum Reserve drawdown, several Notices of Sale may be issued, each covering a sales period of one to two months. Initially, Notices of Sale could allow an extremely short lead time for offers and deliveries. Under the Standard Sales Provisions, it is contemplated that

offerors might be given as little as seven days from the date of issuance, until offers are due, and 30 days or less from the time of such issuance, until the purchasers must accept delivery of the oil, with a less compressed schedule becoming more feasible after the initial stages of drawdown. Because of the possible short lead time, the Standard Sales Provisions provide for establishing a list of prospective offerors who will receive all Notices of Sale.

The next step in the sales process is the submission of offers by prospective purchasers at a time specified in the Notice of Sale. The Standard Sales Provisions require that the offerors unconditionally accept all terms and conditions in the Notice of Sale, including an offer guarantee of \$10 million, or 5 percent of the maximum potential contract amount, whichever is less, and an offer of at least the minimum price, if any, specified in the Notice of Sale.

When offers are received, they are evaluated to select the "apparently successful" offerors. The evaluation process is structured so that the offerors bidding the highest prices can select a method of transportation, up to the limits of the Strategic Petroleum Reserve distribution systems, with specific delivery arrangements negotiated later in the process.

Under the Standard Sales Provisions, all "apparently successful offerors" are required, within five business days after being notified, to provide a Letter of Credit equal to 100 percent of the contract amount, or a cash deposit in an amount equal to 110 percent of the contract value, as a guarantee of performance and payment of amounts due

under the contract.

Upon timely receipt of the financial guarantees, and upon a final determination by the Contracting Officer that the offers are responsive and the offerors responsible, the Department of Energy publicly announces the results of the sale, issues the Notices of Award, and commences deliveries of oil from the Reserve to the purchasers, consistent with their arrangements for commercial pipeline or marine vessel transportation. Such deliveries can begin as soon as the 16th day after the commencement of the sales process, to the extent that the purchasers can submit their financial guarantees and arrange transportation expeditiously.

DRAWDOWN AND DISTRIBUTION CAPABILITIES

The crude oil in the Strategic Petroleum Reserve is segregated in storage to allow for eight distinct crude oil streams to be sold in the event of a drawdown. Table 7 describes these streams and their inventories, as of December 31, 1993, their typical characteristics and the available delivery modes and locations.

Because of the problems associated with an increase in temperature and gas in the crude oil inventory, the Strategic Petroleum Reserve's drawdown and distribution capability has been temporarily lowered from the 3.5 million barrels per day rate, as reported in the Reserve's November 15, 1993, Quarterly Report, to 2.0 million barrels per day.

The current Strategic Petroleum Reserve drawdown and distribution capabilities, shown in Table 8, are based on the crude oil stream inventories as of December 31, 1993, excluding about 60 million barrels affected by increased temperature and gas problems; the existing drawdown systems and commercial distribution capabilities; and the use of interim measures to maximize cooling of the oil during its transit to the distribution terminals where it is blended for an acceptable mix. These capabilities provide for the drawdown and distribution of 520 million barrels of crude oil at an initial sustainable rate of 2 million barrels per day. If necessary, higher rates could be achieved; however, they could only be sustained for significantly less periods of time.

1993 DRAWDOWN SYSTEMS TESTS

During calendar year 1993 the Department of Energy conducted five tests of the Strategic Petroleum Reserve storage site drawdown system capabilities. These tests are summarized as follows:

- On January 28, 1993, 322,000 barrels were drawn down from the Bryan Mound site and delivered simultaneously to the ARCO and Phillips Terminals, demonstrating a combined rate capability of 1.25 million barrels per day.
- On May 8, 1993, 404,000 barrels were drawn down from the West Hackberry site and delivered to Sun Terminal, demonstrating a rate capability of 780,000 barrels per day.
- On October 4, 1993, 1,009,000 barrels were drawn down from the Bayou Choctaw site and delivered to St. James Terminal, demonstrating a rate capability of 480,000 barrels per day.
- On October 30, 1993, 306,000 barrels were drawn down from the Big Hill site to the new Unocal marine distribution terminal, demonstrating a vessel loading capability of 20,000 barrels per hour.
- On November 19, 1994, 430,000 barrels were drawn down from the West Hackberry site, using the site recovery drawdown system and a barge-mounted booster pump provided by the Corps of Engineers, and delivered to Sun Terminal demonstrating a rate capability of 1.2 million barrels per day.

In addition to the above systems tests, a drawdown training exercise, SPRITE-VII, was conducted during the period August 2 through September 17, 1993. This exercise involved the entire Strategic Petroleum Reserve organization in the various functions associated with conducting a drawdown and sale of crude oil in the event of a severe energy emergency. SPRITE-VII was successful in meeting its training objectives and enhancing the Reserve's readiness to meet a drawdown requirement.

TABLE 7
STRATEGIC PETROLEUM RESERVE CRUDE OIL STREAMS*

CRUDE OIL STREAM	INVENTORY (MMB)	TYPICAL API GRAVITY	TYPICAL SUL- FUR CONTENT	DELIVERY MODE AND LOCA- TION
SEAWAY GROUP:				
Bryan Mound Sweet	61.7	36.0°	0.34%	Pipeline or tankship at Phillips Ter- minal, Freeport, TX or Arco Termi- nal, Texas City, TX
Bryan Mound Sour	144.4	33.1°	1.51%	
Bryan Mound Maya	11.1	22.8°	3.28%	Tankship at Phillips Terminal
TEXOMA GROUP:				
West Hackberry Sweet	104.5	36.9°	0.31%	Pipeline, tankship or barge at Sun Terminal, Nederland, TX; Tankship at Unocal Terminal, Neder- land, TX; Pipeline at Texaco-22/DOE connection, Lake Charles, LA; Pipe- line at Texaco-20/DOE connection, Houston, TX
West Hackberry Sour	100.0	33.7°	1.44%	
CAPLINE GROUP:				
Weeks Island Sour	71.8	28.9°	1.41%	Pipeline at Capline or LOCAP Ter- minals, St. James, LA; Tankship at DOE's terminal, St. James, LA
Bayou Choctaw Sweet	17.1	36.1°	0.39%	
Bayou Choctaw Sour	35.1	33.2°	1.47%	
* Data as of December 31, 1993.				

TABLE 8
CURRENT DRAWDOWN AND DISTRIBUTION CAPABILITIES
(THOUSANDS OF BARRELS PER DAY)

Drawdown		Distribution
Seaway Group	582	1,250
Texoma Group	1000	1,940
Capline Group	398	1,070
TOTAL		4,260
		2,000

CUSTOMER SERVICE TO THE NATION AND U.S. REFINERS

The Strategic Petroleum Reserve serves both the Nation and U.S. refiners by providing energy security against potential disruptions in petroleum supplies, and by providing refiners maximum accessibility to the Nation's stockpile in the event of a disruption.

SPR PROTECTION FOR THE NATION

In the Energy Policy and Conservation Act, the Strategic Petroleum Reserve was established to reduce the impact of disruptions in petroleum supplies, and to meet U.S. obligations under the International Energy Program. Congress also specified that the size of the Reserve should be based on the largest 90-day period of petroleum imports over the prior two years (i.e., 1974-75). This 90-day stockpile was not a requirement for subsequent years, but has continued to be a benchmark measure of import protection.

As of December 31, 1993, the inventory of crude oil in the Reserve amounted to 587 million barrels, providing a net import protection level of 79 days, based on the 1993 net import rate for crude and petroleum products. As shown in Figure 7, the level of net import protection has continued to decline over the last two years, due to increasing dependency on oil imports. Over the last ten years, U.S. crude oil imports have increased from 26 percent of the total crude oil processed in 1983, to 49 percent of the total crude oil processed in 1993.

Under the International Energy Program agreement, member nations agree to maintain stocks of crude and product in reserves "sufficient to sustain consumption for at least 90 days with no net oil imports." For the International Energy Program computation, member stocks are based on both public and privately-held stocks, and net oil imports are defined to be the average daily level in the previous year.

The last International Energy Agency computation for the United States was in October 1993 and credits the United States with 206 days of emergency reserves.

U.S. REFINING INDUSTRY ACCESS TO SPR OIL

The Strategic Petroleum Reserve is designed to distribute crude oil to U.S. refiners through commercial pipelines and marine terminals. The Reserve is currently accessible to 54 refiners by commercial pipelines. In 1993, these 54 refiners comprised approximately 49 percent of U.S. refining capacity, and processed 55 percent of all non-Canadian crude oil imports.

The Reserve is also connected to five marine terminals: ARCO, Phillips, Sun, Unocal and the Department of Energy's St. James Terminal. These terminals have a total of 13 tanker berths and three barge berths, with a combined shipping capacity of 2.4 million barrels of crude oil per day. Figure 8 shows the

Reserve's pipeline and marine distribution capabilities.

FIGURE 7
DAYS OF NET IMPORT PROTECTION

SPR INVENTORY (YEAR END)
NET PETROLEUM IMPORTS (YEAR AVG.)

Figure 8

STRATEGIC PETROLEUM RESERVE PIPELINE AND MARINE DISTRIBUTION CAPABILITIES

APPENDICES

A. Strategic Petroleum Reserve Site Status

B. Strategic Petroleum Reserve Crude Oil Specifications

APPENDIX A

Strategic Petroleum Reserve Site Status

BAYOU CHOCTAW

LOCATION

Iberville Parish, Louisiana (12 miles southwest of Baton Rouge, Louisiana).

ACQUISITION

Acquired 355.95 acres fee simple, by condemnation April 1977, from numerous private owners. Union Texas Petroleum (a subsidiary of Allied Corporation) was the previous operator.

In 1985 the Department of Energy acquired an additional existing cavern through a cavern exchange agreement with Union Texas Petroleum. The transaction involved a 3.5 acre exchange with no net change in Government-owned acreage.

ENVIRONMENTAL/PERMITS

Environmental Impact Statement published December 1976; supplement published May 1977.

Four major Federal and State permits related to pipeline, well pad, storage, and storm water runoff acquired in 1978, and updated in 1980 and 1981.

SITE DESCRIPTION

A 75-million-barrel storage facility consisting of 65 million barrels in five

existing caverns, plus 10 million barrels of storage capacity in a new Strategic Petroleum Reserve-developed cavern.

Oil, brine, and raw water piping distribution system connecting caverns with central plant, a water intake structure, 12 brine disposal wells located 2.5 miles offsite, and a pipeline for supplying brine to Union Texas Petroleum, Inc. Oil and water distribution system consists of over 50,000 feet of piping and 16 pumps totaling 22,000 horsepower. A 100,000 barrel brine pond and an oil/brine separator are also onsite.

Numerous permanent specialized buildings include: Control Center, Security Operations Center, Maintenance Shop and Laboratory, Electrical Switch Gear (5KV), Spare Parts Warehouse, Foam Storage, Instrument Shop, Documentation Storage and a Guard House.

SYSTEM PARAMETERS

Oil fill via 36-inch-diameter, 37.2-mile pipeline from St. James Terminal. Sustained system rate - 110,000 bbl/d (brine disposal-constrained).

Raw water design pumping rate - 495,000 bbl/d.

Brine disposal design pumping rate -
110,000 bbl/d.

DRAWDOWN

Drawdown via 36-inch-diameter, 37.2-mile pipeline to St. James Terminal and to Capline pipeline.

Design drawdown capability - 480,000 bbl/d.

MAJOR ACCOMPLISHMENTS

Approximately 52 million barrels of oil are in storage.

Upgraded the Brine Filter System.

Awarded contract to modify the header and thermal relief systems.

WEEKS ISLAND

LOCATION

Iberia Parish, Louisiana (95 miles southwest of New Orleans).

ACQUISITION

Acquired 382.92 acres fee simple subsurface and 6.63 acres fee simple surface, by condemnation September 1977, from Morton Salt Company.

ENVIRONMENTAL/PERMITS

Environmental Impact Statement published January 1977; supplement published August 1977.

Major Federal permit related to oil pipeline to St. James Terminal acquired in 1978. Three major Federal and State permits related to oil storage, air emissions and storm water, and treated sewage effluent discharge acquired in 1979; Environmental Protection Agency National Pollutant Discharge Elimination System permit updated in 1982.

SITE DESCRIPTION

Conventional room and pillar salt mine containing 70 million barrels of storage capacity in two levels. Dedicated to sour crude oil storage.

Oil piping distribution system consists of 11 (10 operational and one reserve) submersible electric pumps in the mine to boost crude to the surface and twin main-line pumps (plus one reserve) to deliver crude to the St. James, Louisiana Terminal during drawdown. Pumps total

17,000 horsepower. Firewater system has a 500,000 gallon tank with pumps, and mine inert gas and vapor recovery systems provide for safety.

Numerous permanent specialized buildings include: Administration and Maintenance, Control Center, Security Operations Center, Spare Parts Warehouse, Electrical Substation, Laboratory and Sample, Inert Gas Generator, Foam Storage, Fire Water Pump House, Mainline Pump House, Production Shaft Headframe, Production Shaft Hoist, Service Shaft Headframe, Service Shaft Hoist, Service Shaft Motor Control Center, and a Guard House.

SYSTEM PARAMETERS

Oil fill via 36-inch-diameter, 67.2 mile pipeline from St. James Terminal. Sustained system rate - 350,000 bbl/d (terminal throughput limited).

DRAWDOWN

Drawdown via 36-inch-diameter 67.2-mile pipeline to St. James Terminal and to Capline pipeline.

Design drawdown capability - 590,000 bbl/d.

MAJOR ACCOMPLISHMENTS

Approximately 72 million barrels of crude oil are in storage.

Completed mine integrity construction and equipment installation.

Awarded contract for replacement of the
production shaft building.

BRYAN MOUND

LOCATION

Brazoria County, Texas (three miles southwest of Freeport, Texas).

ACQUISITION

Acquired 499.47 acres fee simple, by condemnation April 1977, from Freeport Mineral Company and other owners. Dow Chemical Company was the previous operator.

In 1986 Department of Energy acquired the pre-existing Brazoria County Road 242 within the site boundary through a relocation agreement with the county.

ENVIRONMENTAL/PERMITS

Environmental Impact Statement published January 1977; supplement published December 1977. Phase III supplement published October 1981.

Five major Federal and State permits related to pipelines, water intake, and storage acquired in 1977 and 1978. National Pollution Discharge Elimination System updated 1981; renewed 1984. Seaway Environmental Impact Statement published June 1978. Supplement published October 1981.

Two major Federal permits related to brine disposal pipeline issued in 1978. Permit for brine discharge increased to 1.1 million bbl/d August 1981.

SITE DESCRIPTION

226-million-barrel storage facility

consisting of 66 million barrels of capacity in four caverns existing upon site acquisition, plus 160 million barrels of storage capacity in 16 Strategic Petroleum Reserve-developed caverns.

36-inch-diameter, 14.6-mile brine disposal pipeline extending 13 miles offshore in the Gulf of Mexico.

Oil, brine and raw water piping distribution system connecting caverns with central plant and water intake structure located on Brazos River and connected by a 36-inch pipeline. Oil/brine/water distribution system consists of over 101,000 feet of piping and 33 pumps totaling over 43,000 horsepower. Four 200,000-barrel oil storage tanks, two brine ponds (15,000 and 150,000 barrels), and an oil-brine separator.

Numerous permanent specialized buildups include: Control Center, Security Operations Center, Maintenance, Spare Parts Warehouse, Foam Generator, Foam Storage (3), Electrical Switch Gear, and a Guard House.

SYSTEM PARAMETERS

Fill via 30-inch-diameter, 3.6-mile pipeline from Phillips Freeport Marine Terminal. Design oil fill rate - 240,000 bbl/d. Sustained system rate - 180,000 bbl/d.

Raw water design pumping rate - 1,250,000 bbl/d.

Brine disposal design pumping rate - 980,000 bbl/d (permit limitation 1,100,000 bbl/d).

DRAWDOWN

Drawdown via 30-inch diameter, 3.6 mile pipeline, to Phillips 66 Freeport Marine Terminal.

Drawdown via 40-inch diameter, 46-mile pipeline to ARCO Pipeline Company's Texas City Pipeline Terminal and Docks.

Design drawdown capability - 1,250,000 bbl/d.

MAJOR ACCOMPLISHMENTS

Approximately 217 million barrels of crude oil are in storage.

Awarded contract for construction of a new cement coated brine disposal pipeline to the Gulf, replacing the existing worn-out pipeline.

Improvement projects completed included: Tray and Duct Bank System, Point storage tanks, dredging to the raw water structure enhanced resistance grounding and lighting protection.

Awarded contract for a Crude Oil Testing Laboratory.

WEST HACKBERRY

LOCATION

Cameron Parish, Louisiana (22 miles southwest of Lake Charles, Louisiana).

ACQUISITION

Acquired 405.36 acres fee simple, by condemnation April 1977, from numerous private landowners. Olin Corporation was the previous site operator.

Acquired 160.0 additional acres fee simple by condemnation in two actions, July 1979 and March 1980.

ENVIRONMENTAL/PERMITS

Environmental Impact Statement published January 1977; supplement published April 1977. Phase III supplement published October 1981.

Six major Federal and State permits related to pipelines, drilling pads, water intake, and storage acquired in 1977 and 1978; National Pollutant Discharge Elimination System permit renewed 1984.

Texoma Environmental Impact Statement published November 1978; supplement published in October 1981.

Two major Federal permits related to a brine pipeline acquired in 1980.

SITE DESCRIPTION

219-million-barrel storage facility consisting of 49 million barrels in five caverns existing upon site acquisition, plus 170 million barrels of storage capacity in 17 Strategic Petroleum Reserve-developed caverns.

Oil, brine, and raw water piping distribution system connecting caverns with central plant, water intake structure located on Intracoastal waterway connected by a 42-inch diameter, 4.5 mile pipeline, and 10 brine disposal wells. Consists of over 160,000 feet of piping and 45 pumps totaling over 82,000 horsepower. Brine disposal is via injection wells due to the decommissioning of the 27 mile brine line to the Gulf a 175,000-barrel brine pond and an oil-brine separator.

Numerous permanent specialized buildings include: Control Center, Security Operations Center, Maintenance, Spare Parts Warehouse, Covered Lay-Down, Film Storage, Foam Storage, and a Guard House.

SYSTEM PARAMETERS

Fill via 42-inch diameter, 42.8-mile pipeline from Sun Terminal, Nederland, Texas. Design oil fill rate - 225,000 bbl/d. Sustained system rate - 175,000 bbl/d.

Raw water design pumping rate - 1,450,000 bbl/d.

Brine disposal design rate - 150,000 bbl/d via injection wells.

DRAWDOWN

Drawdown via a Department of Energy 42-inch-diameter, 42.8-mile pipeline to the Sun and Unical Terminals, Nederland, Texas.

Drawdown via a 36-inch diameter, 12-mile oil pipeline (Department of Energy Lake Charles Pipeline) connecting to the Texas

22-inch common carrier pipeline and to refineries in Lake Charles, Louisiana.

Design drawdown capability - 1,250,000 bbl/d.

MAJOR ACCOMPLISHMENTS

Approximately 205 million barrels of oil in storage.

Completed initial recompletion of existing brine disposal wells to provide subsurface disposal capability while brine disposal pipeline to the Gulf of Mexico remains shut down for evaluation.

Awarded contract for an environmental cap on brine ponds and completed revegetation of Department's pipeline easements to Lake Charles.

Installed additional subsidence monitors on salt dome.

BIG HILL

LOCATION

Jefferson County, Texas (20 miles southwest of Beaumont, Texas).

ACQUISITION

Acquired 271 acres fee simple, by condemnation November 1982 and July 1983, from three landowners, i.e., 238.48 acres from Amoco, 27.06 acres from the Pipkin estate, and 5.46 acres from the Patrick Henry Phelan estate.

ENVIRONMENTAL/PERMITS

Environmental Impact Statement published October 1981.

State permits for drilling, underground hydrocarbon storage, pipeline operations, air quality, water appropriation, and water quality certifications were acquired in 1983. The Environmental Protection Agency National Pollutant Discharge Elimination System permit was acquired in 1984.

SITE DESCRIPTION

160-million-barrel storage facility consisting of fourteen Strategic Petroleum Reserve-developed 11.5-million-barrel storage caverns.

Oil, brine, and raw water systems connecting caverns with central plant, water intake structure located on the Intracoastal Waterway connected by a 48-inch diameter, and brine disposal pipeline extending 3 miles offshore in the Gulf of Mexico. Oil and water distribution system consists of over 29 miles of piping and 15 pumps totaling 32,000 horsepower.

Numerous permanent specialized buildings include: Control Center, Administration, Security Operations Center, Communications, Guard House, Covered Lay-Down, Fire House, Sample Storage, and Maintenance.

SYSTEM PARAMETERS

Fill via 36-inch-diameter, 25 mile pipeline from Sun Terminal, Nederland, Texas. Sustained system rate 280,000 bbl/d.

Raw water design pumping rate - 1,400,000 bbl/d.

Brine disposal design pumping rate - 1,400,000 bbl/d (permit limitation of 1,700,000 bbl/d).

DRAWDOWN

Drawdown via 36-inch-diameter, 25 mile pipeline to the Sun and Unocal Terminals, Nederland, Texas.

Design Drawdown capability - 930,000 bbl/d.

MAJOR ACCOMPLISHMENTS

Approximately 38 million barrels of crude oil in storage.

Awarded contract for a Crude Oil Testing Laboratory.

Completed distribution enhancements with a connection to the Texaco's Houston pipeline.

ST. JAMES TERMINAL

LOCATION

St. James Parish, Louisiana (45 miles south-east of Baton Rouge, Louisiana, on the Mississippi River).

ACQUISITION

Acquired 104.76 acres of fee simple for terminal by condemnation in May 1978.

Acquired 47.68 acres fee simple for docks by condemnation in July 1978.

ENVIRONMENTAL/PERMITS

St. James Terminal Environmental Impact Statement is a component of the Bayou Choctaw supplement, published May 1977, and the Weeks Island supplement, published August 1977.

Two major Federal and State permits related to dock construction were acquired in 1978. Environmental Protection Agency discharge permit for storm water and sewage acquired in 1980. Dock Construction Permit modified 1982.

SITE DESCRIPTION

Terminal facilities include six storage tanks totaling two million barrels of capacity and tie-ins to Bayou Choctaw and Weeks Island sites, and to LOCAP and Capline pipeline terminals.

Oil distribution piping system connecting docks, tanks, and pump station consists of over 35,000 feet of piping and five pumps totaling over 7,500 horsepower, metering systems, and maintenance and control buildings.

Two docks with one berth each, able to accommodate vessels of up to 123,000 long tons maximum loaded displacement. A 42-inch-diameter pipeline connects the docks to the storage tanks.

SYSTEM PARAMETERS

Tanker loading - design loading capacity of 40,000 bbl/hr.

Fill capabilities from terminal to:

Bayou Choctaw: design pumping rate - 240,000 bbl/d.

Weeks Island: design pumping rate - 480,000 bbl/d.

Terminal sustained system fill rate: 350,000 bbl/d.

DISTRIBUTION

Distribution capabilities from terminal to:

LOCAP Terminal - 45,000 bbl/hr.

Capline Terminal - 45,000 bbl/hr.

Sustained Tanker Loading Rate - 430,000 bbl/d.

MAJOR ACCOMPLISHMENTS

Initiated inspection, repair cleaning and painting of tankers.

APPENDIX B

Strategic Petroleum Reserve Crude Oil Specifications

Characteristic	Sour ^a	Sweet ^a	Primary ASTM Test Method ^d
API Gravity [°API]	30 - 45	30 - 45	D 1298
Total Sulfur [Wt.%], Max.	1.99	0.50	D 1552
Pour Point [°F(°C)], Max.	50 (10)	50 (10)	D 97
Salt Content [Lbs./1,000 Bbls.], Max.	50	50	D 3230
Viscosity [SUS @ 60°F (cSt @ 15.6°C)], Max. [SUS @ 100°F (cSt @ 37.8°C)], Max.	150 (32) 70 (13)	150 (32) 70 (13)	D 445 & D 2161
Reid Vapor Pressure [Psia @ 100°F (kPa @ 37.8°C)], Max.	11 (76)	11 (76)	D 323
Total Acid Number [mg KOH/g], Max.	0.40	0.40	D 664
Water and Sediment [Vol. %], Max.	1.0	1.0	D 473 & D 4006 or D 4928
Yields [Vol. %] Naphtha [82-375°F (28-191°C)] Distillate [375-620°F (191-327°C)] Gas Oil [620-1050°F (327-566°C)] Residium [>1050°F(>566°C)]	24 - 30 17 - 31 26 - 38 10 - 19	21 - 42 19 - 45 20 - 42 14 Max.	D 2892 & D1160
^a Marketable virgin crude petroleum suitable for normal refinery processing and free of foreign contaminants or chemicals including, but no limited to, chlorinated and/or oxygenated hydrocarbons, and lead. ^b Crude oils that meet these sour specifications include Arabian Berri, Arabian Light, Dubai (Fateh), Flotta, Isthmus, Lagomedio, Oman, Qatar Marine, Tia Juana Light, Upper Zakum, and West Texas Sour. ^c Crude oil that meet these sweet specifications include Bonny Light, Brass River, Brent Blend, Ekofisk, Escravos, Forties, Kole Marine, Oseberg, Palanca, Saharan Blend, Statfjord, West Texas Intermediate, and Zarzaitine. NOTE: Crude oils other than those listed above may be acceptable. The acceptability of any crude oil depends upon an assay typical of current production quality of the stream. ^d Alternate methods may be used if approved within the contract. Offerors shall submit requests to use alternate methods to the Contracting Officer for determination of acceptability. In case of disputes arising from a difference between origin and destination test results, results from testing of the custody transfer sample using the primary test method shall be binding.			

DATE
FILMED

7/25/94

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