U.S. DEPARTMENT OF ENERGY

Strategic Petroleum Reserve Annual Report for Calendar Year 2022

Report to Congress
October 2023

United States Department of Energy
Washington, DC 20585

Message from the Secretary

The Secretary of Energy[1] is required to report annually to the President and Congress on the activities of the Strategic Petroleum Reserve. Highlights of the Department's accomplishments are included in the Executive Summary of this report, the Strategic Petroleum Reserve Annual Report for Calendar Year 2022.

This report also includes details concerning the physical capacity, type, and quantity of petroleum in the Strategic Petroleum Reserve in 2022, as well as plans for upgrades and major maintenance. The Energy Policy and Conservation Act requires the Secretary to report information on the current withdrawal and distribution rates and capabilities of the Strategic Petroleum Reserve; the history and costs of petroleum acquisitions for the Strategic Petroleum Reserve; and the costs associated with operations, maintenance, management, and planned projects for the Strategic Petroleum Reserve.

This report is being provided to the President and the following members of Congress:

- **The Honorable Patty Murray**
  Chair, Senate Committee on Appropriations

- **The Honorable Susan Collins**
  Vice Chair, Senate Committee on Appropriations

- **The Honorable Sheldon Whitehouse**
  Chairman, Senate Committee on the Budget

- **The Honorable Chuck Grassley**
  Ranking Member, Senate Committee on the Budget

- **The Honorable Dianne Feinstein**
  Chair, Subcommittee on Energy and Water Development
  Senate Committee on Appropriations

- **The Honorable John Kennedy**
  Ranking Member, Subcommittee on Energy and Water Development
  Senate Committee on Appropriations

- **The Honorable Joseph Manchin**
  Chairman, Senate Committee on Energy and Natural Resources

[1] Section 165 of the Energy Policy and Conservation Act, as amended [Pub. L. No. 94-163, title I (Dec. 22, 1975) (42 U.S.C. § 6245)].

- **The Honorable John Barrasso**
  Ranking Member, Senate Committee on Energy and Natural Resources

- **The Honorable Kay Granger**
  Chairwoman, House Committee on Appropriations

- **The Honorable Rosa DeLauro**
  Ranking Member, House Committee on Appropriations

- **The Honorable Chuck Fleischmann**
  Chairman, Subcommittee on Energy and Water Development, and Related Agencies
  House Committee on Appropriations

- **The Honorable Marcy Kaptur**
  Ranking Member, Subcommittee on Energy and Water Development, and Related Agencies
  House Committee on Appropriations

- **The Honorable Jodey Arrington**
  Chairman, House Committee on the Budget

- **The Honorable Brendan Boyle**
  Ranking Member, House Committee on the Budget

- **The Honorable Cathy McMorris Rodgers**
  Chair, House Committee on Energy and Commerce

- **The Honorable Frank Pallone**
  Ranking Member, House Committee on Energy and Commerce

If you have any questions or need additional information, please contact Ms. Rebecca Ward, Deputy Assistant Secretary for Senate Affairs or Ms. Janie Thompson, Deputy Assistant Secretary for House Affairs, Office of Congressional and Intergovernmental Affairs, at (202) 586-5450; or Ms. Katie Donley, Director, Office of Budget, Office of the Chief Financial Officer, at (202) 586-7607.

Sincerely,

Jennifer Granholm

Executive Summary

Program Highlights and Status

The Strategic Petroleum Reserve (SPR) provides the United States with energy and economic security through emergency stockpiles of refined petroleum products and crude oil. The SPR stores crude oil stocks at four storage-site facilities: Bryan Mound and Big Hill in Texas and Bayou Choctaw and West Hackberry in Louisiana. The SPR also stores refined petroleum products in the Northeast.

The SPR entered calendar year (CY) 2022 with 593.7 million barrels (MMbbl) of crude oil, and at the end of CY 2022 (as of December 31, 2022), the SPR held 372.1 MMbbl. The net decrease of crude oil is a result of the SPR conducting one congressionally mandated crude oil sale, the fiscal year (FY) 2022 Winter Exchange in CY 2022, Presidentially authorized emergency sales in response to Russia's invasion of Ukraine totaling over 180 MMbbl, drawdown of barrels held for the Government of Australia (GOA), and the Keystone Exchange.

The Consolidated Appropriations Act, 2022 (Public Law 117-103) appropriated $197 million to the SPR Account for operating and maintaining the SPR and $22 million for the Northeast Gasoline Supply Reserve (NGSR). Congress also appropriated $7.35 million for the SPR Petroleum Account to fund the cost of the SPR mandatory crude oil sales. Obligations for the SPR in FY 2022 totaled approximately $227.6 million. From this amount, the SPR obligated $26.2 million for Federal program management, $177.7 million for contractual goods and services to operate and maintain the reserve, and $23.7 million for the NGSR storage costs and administrative oversight.

The SPR Petroleum Account spent $33.2 million related to the cost of moving oil in CY 2022.

Changes to Performance Capabilities

Vapor Pressure Mitigation Program

The use of deep underground solution-mined salt caverns for long-term storage of crude oil subjects the oil to geothermal heating and gas intrusion from the surrounding salt. That exposure tends to increase the crude oil vapor pressure. During a drawdown, SPR oil delivered to storage tanks at terminals may contain toxic and flammable gases at levels that can present environmental and health risks to terminal personnel and the public. The SPR mitigates these risks by using a customized, portable degasification unit that reduces the crude oil vapor pressure in the caverns for safe crude oil delivery. The unit moves among the SPR sites every 2–5 years, as necessary, to degas caverns that show high levels of vapor pressure.

A new, modern unit is under design as part of the SPR Modernization Program's Life Extension Phase 2 (LE2) Project. The new degasification unit is scheduled to be operational at Bryan Mound in 2025. However, due to lack of funding, the new degasification unit is no longer

planned to be built. Instead, the SPR is evaluating other short-term alternatives to reduce the need for degasification. One of these alternatives is the use of mechanical refrigeration Chillers. The SPR is also working on a Major Maintenance task to install mechanical refrigeration Chillers at each SPR site to mitigate vapor pressure and increase the availability of caverns for sales and exchanges.

Environment, Safety, and Health

The SPR continued to prioritize safety and health at the sites. During 2022, the SPR achieved a Total Recordable Case (TRC) Rate of 0.15 and a Days Away/Restricted/Transferred (DART) Rate of 0.15. These low rates of incidents involving injuries or illnesses, near the lowest of all time, positioned all four SPR storage sites for noteworthy achievements in the Occupational Safety and Health Administration's (OSHA) Voluntary Protection Program (VPP). The VPP program is OSHA's official recognition that the employers and employees at a site have implemented an exemplary occupational safety and health system and maintained injury and illness rates below the averages for their respective industry. The Big Hill, Bryan Mound, and Bayou Choctaw storage sites each received the "Star Award" for achieving incident rates at or below the national average. The West Hackberry site received an additional VPP award, the "Star of Excellence," for achieving incident rates at least 90 percent below the national average.

In addition, a third-party auditor found the SPR's Environmental Management System to be in compliance with the International Organization for Standardization's (ISO) 14001 standards.

STRATEGIC PETROLEUM RESERVE ANNUAL REPORT FOR CALENDAR YEAR 2022

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I. Legislative Language

The Energy Policy and Conservation Act (EPCA), (42 U.S.C. 6201 et seq.), enacted on December 22, 1975 (Public Law 94-163), formally established the Strategic Petroleum Reserve (SPR). Since then, the SPR has operated to reduce the impact of oil supply disruptions and to carry out obligations under the International Energy Program.

Section 165 of EPCA, as amended, requires the Secretary of Energy to submit an annual report to the President and Congress on the activities of the SPR. Consistent with this statutory provision, this Strategic Petroleum Reserve Annual Report for CY 2022 includes:

- Status of the physical capacity of the SPR and the type and quantity of petroleum products stored in the SPR;
- Estimate of the schedule and cost to complete planned equipment upgrades or capital investments in the SPR, including upgrades and investments carried out as part of operational maintenance or life extension activities;
- Identification of any life-limiting conditions or operational problems at any SPR facility, and proposed remedial actions including an estimate of the schedule and cost of implementing those remedial actions;
- Description of current withdrawal and distribution rates and capabilities, and an identification of any operational or other limitations on those rates and capabilities;
- Listing of petroleum product acquisitions made in the preceding year and planned in the following year, including quantity, price, and type of petroleum;
- Summary of the actions taken to develop, operate, and maintain the SPR;
- Summary of the financial status and financial transactions of the SPR Account and the SPR Petroleum Account for the year;
- Summary of expenses for the year, and the number of Federal and contractor employees;
- Status of contracts for development, operation, maintenance, distribution, and other activities of the SPR;
- Summary of foreign oil storage agreements and implementation status.

II. Program Mission

Introduction

The SPR operates pursuant to the authority of EPCA (42 U.S.C. 6201 et seq.), as amended. Congress enacted EPCA in recognition of the vulnerability of the U.S. to disruptions in the world oil market. One of the purposes of EPCA was to create a petroleum reserve capable of reducing the impact of severe energy supply interruptions.

As of December 31, 2022, the SPR contained 372.1 MMbbl of crude oil. In addition to the SPR's mission to protect the U.S. economy from the effects of a severe energy supply interruption and consequences of interruptions in supplies of petroleum products, the U.S. relies on the SPR to fulfill its obligations under the International Energy Program.

Legislative Activity

The following laws enacted through the date of this report directly affect the SPR program now or are expected to affect the SPR over the next decade and beyond:

- Section 20003 of the Tax Cuts and Jobs Act of 2017 (Public Law 115-97) directs the Secretary of Energy (the "Secretary") to sell 7 MMbbls from the SPR in FYs 2026–2027.

- Section 30204 of the Bipartisan Budget Act of 2018 (Public Law 115-123) directs the Secretary to sell 30 MMbbls from the SPR in FYs 2022–2025; 35 MMbbls in FY 2026; and 35 MMbbls in FY 2027. The FY 2023 Omnibus Appropriation Act cancelled the sales in FY 2026 and FY 2027 as part of a recission of $10.4 billion from the SPR Petroleum Account from revenue earned from the sale of emergency barrels in CY 2022.

- Section 403 of the Bipartisan Budget Act of 2015 (Public Law 114-74) requires the Secretary to draw down and sell a total of 58 MMbbls of crude oil from the SPR over 8 consecutive years, commencing in FY 2018 and continuing through FY 2025. The FY 2023 Omnibus Appropriation Act cancelled sales of 10 million barrels in FY 2024 and 10 million barrels in FY 2025 as part of a recission of $10.4 billion from the SPR Petroleum Account from revenue earned from the sale of emergency barrels in CY 2022.

- Section 404 of the Bipartisan Budget Act of 2015 (Public Law 114-74) authorized the Secretary to sell crude oil in an amount up to $2 billion for the period encompassing FY 2017–2020. The fourth and final Energy Security and Infrastructure Modernization (ESIM) sale was not completed in 2020 as planned due to the Coronavirus disease 2019 (COVID-19) pandemic. Section 14002 of the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) (Public Law 116-136) provided the Department flexibility to conduct the final ESIM sale in FY 2020, FY 2021, or FY 2022. The fourth and final ESIM sale was completed in June 2021.

- Section 32204 of the Fixing America's Surface Transportation Act (FAST Act) (Public Law 114-94) requires the Secretary to draw down and sell a total of 66 MMbbls of crude oil from the SPR, or a volume which generates up to $6.2 billion, over three consecutive years, commencing in FY 2023 and continuing through FY 2025. The FY 2023 Omnibus Appropriation Act cancelled sales of 25 million barrels in FY 2024 and 25 million barrels in FY 2025 as part of a recission of $10.4 billion from the SPR Petroleum Account from revenue earned from the sale of emergency barrels in CY 2022.

- Section 3009 of America's Water Infrastructure Act of 2018 (Public Law 115-270) requires the Secretary to draw down and sell a total of 5 MMbbls of crude oil from the SPR in FY 2028.

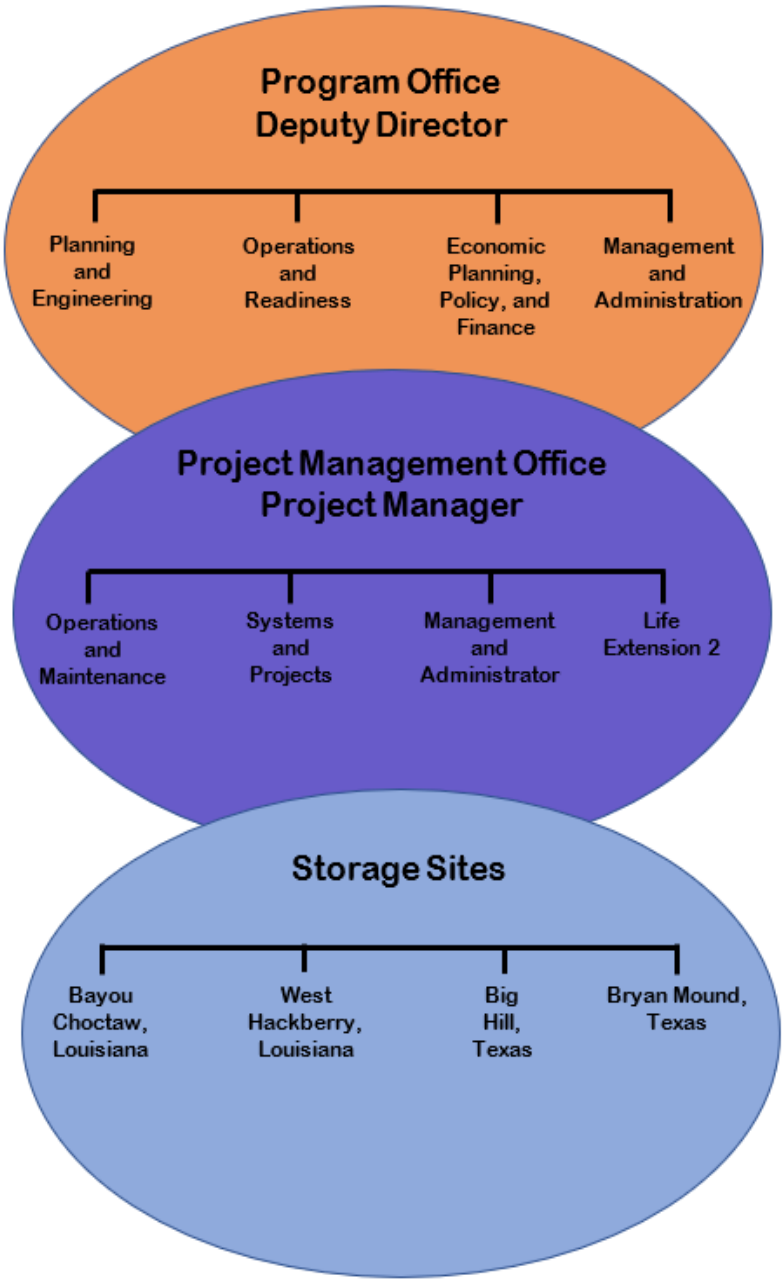
- Section 90002 of the Infrastructure Investment and Jobs Act (Public Law 117-58) requires the Secretary to draw down and sell a total of 87.6 MMbbls of crude oil from the SPR in FY 2028 – FY 2031.

III. Program Management

Organization

At the beginning of 2022, the Assistant Secretary (AS) for Fossil Energy and Carbon Management (FECM), located at U.S. Department of Energy (DOE) headquarters in Washington, DC, had overall program responsibility for carrying out the SPR's mission and maintaining operational readiness. On August 28, 2022, the Office of Petroleum Reserves transitioned from FECM to the Office of Cybersecurity, Energy Security, and Emergency Response (CESER), led by Director Puesh Kumar. This responsibility was and remains further delegated to the Deputy Director (DD) for Petroleum Reserves, who leads the Program Office (PO), also in Washington, DC. The DD for Petroleum Reserves executes the SPR mission through the Strategic Petroleum Reserve Project Management Office (SPR PMO) in New Orleans, Louisiana. The SPR PMO supervises day-to-day operations of the PMO. As of December 31, 2022, PO staffing stood at 21 Federal employees and 10 contractor employees, while SPR PMO staffing was 96 Federal employees and 761 contractor employees overseeing the base program. Figure 1 depicts the SPR's organizational structure.

Figure 1. Strategic Petroleum Reserve Organizational Structure



Contractual Support

The SPR PMO is responsible for operations, maintenance, design, and construction of the SPR. The SPR PMO primarily fulfills this responsibility through a management and operating (M&O) contractor, currently Fluor Federal Petroleum Operations (FFPO). FFPO provides leadership and expertise to operate and maintain SPR facilities and systems. The period of performance for the current contract is 5 years and began on April 1, 2014, with one 5-year option. On August 15, 2018, the SPR exercised the 5-year option period, which extends the contract's period of performance through March 31, 2024.

Vali Cooper International, a Service-Disabled Veteran-Owned Small Business architectural and engineering (A&E) firm, and Tanaka Madison Consulting, a Woman-Owned Small Business A&E firm, are under contract to provide design services for the four SPR storage facilities. The 5-year period of performance on each contract is from August 12, 2020, through August 11, 2025.

Several support services contracts exist for management, technical, and computer support. The largest support service contractor at the beginning of FY 2022 is Infinity Technology, an 8(a) and certified Service-Disabled Veteran-Owned Small Business that provides management and technical support services. This contract began on November 1, 2016, with a 2-year base period of performance and three 1-year options. The contract was extended 1 month from October 31, 2021, to November 30, 2021, to facilitate the award of the new support services follow-on contract to Chenega Enterprise Systems & Solutions, a certified 8(a) Alaska Native Corporation. This contract began December 1, 2021, with a 2-year base period of performance and three 1-year options and expires November 30, 2026, should all options be exercised.

Other contractors providing support to the PO in Washington, DC, in 2022 included AOC Petroleum Support Services, LLC; and Cyborg, Inc.

The SPR purchased power for the four storage sites from Gexa Energy, CenterPoint Energy, Entergy Texas, and Entergy Louisiana, LLC.

In CY 2022, the SPR held contracts with three commercial facilities that provided terminal services for fill, drawdown, and storage of crude oil. The SPR has a contract with Sunoco Partners Marketing & Terminals, L.P., Phillips 66 Beaumont Terminal, and Seaway Crude Pipeline Company.

In addition to the contract relationships, DOE's Sandia National Laboratory provides valuable geotechnical support to the SPR that includes analysis of the salt domes, cavern integrity, vapor pressure, crude oil quality, and new cavern development.

IV. Crude Oil Storage Program

Strategic Petroleum Reserve Storage Facilities

The SPR currently operates and maintains four crude oil storage facilities in the Gulf Coast region of the U.S. All oil stored in SPR facilities is stored in large underground caverns created in salt dome formations. Salt dome storage technology provides maximum security and safety for the Nation's stockpile of crude oil and is also the lowest-cost technology for large-scale petroleum storage. The average operational cost for the SPR in FY 2022 was $0.28 per barrel, which includes the cost for operational management, staffing, security operations, and maintenance. The average operational cost for the SPR does not include infrastructure-related costs that are funded by the LE2 project and long-term wear and tear on the caverns due to oil movements.

The SPR has two sites in Texas (Bryan Mound and Big Hill) and two sites in Louisiana (West Hackberry and Bayou Choctaw). The four sites have a combined storage capacity of 713.52 MMbbl and an initial drawdown capability of 4.415 per day MMbbl/d. Shown in Table 1 is the authorized storage capacity and sustained drawdown capability of each SPR site as of December 31, 2022.

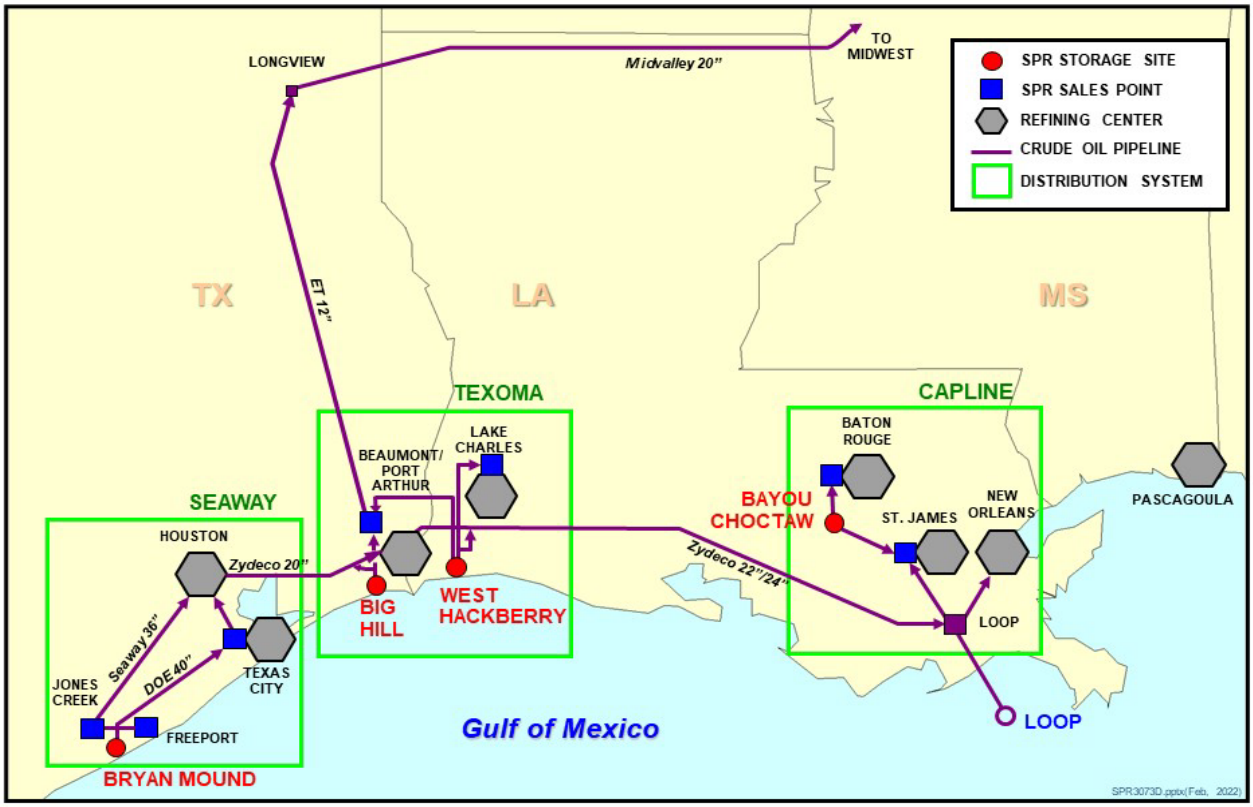
Table 1. Authorized Storage Capacity and Sustained Drawdown Capability (As of December 31, 2022)

CURRENT SITE CAPABILITY			
Storage Facility	**Authorized Storage Capacity (MMbbl)**	**Crude Mix Sweet/Sour (MMbbl)**	**Current Sustained Drawdown Capability (MMbbl/d)**
Bryan Mound	**247.14**	**66.6/109.6**	**1.500**
West Hackberry	**220.38**	**67.1/40.0**	**0.000**
Big Hill	**170.0**	**33.0/20.4**	**0.455**
Bayou Choctaw	**76.00**	**1.1/32.9**	**0.308**
Total Program	**713.52**	**169.1/203.0(45%/55%)**	**2.263**

Sweet = Sulfur content < 0.5 percent; Sour = Sulfur content > 0.5 percent
MMbbl = Million Barrels

The SPR's oil storage facilities are grouped into three geographical pipeline distribution systems in the Gulf Coast: Seaway, Texoma, and Capline. Each of these pipeline systems have access to one or more major refining centers, interstate crude oil pipelines and marine terminals for crude oil distribution. The locations of the SPR storage sites and respective distribution systems are shown in Figure 2.

Figure 2. Storage Sites and Distribution System



Cavern Maintenance

The Cavern Integrity program is responsible for the maintenance and operation of the SPR's 60 active storage caverns and 121 total wells. The two Louisiana sites also contain 21 brine disposal wells. The SPR also maintains four decommissioned caverns that are no longer used for crude oil storage. Key responsibilities include ensuring the safe and complete containment of crude oil and brine within the cavern-well systems and maintaining compliance with state regulations promulgated by the Louisiana Department of Natural Resources and the Texas Railroad Commission. These responsibilities are accomplished through periodic wireline caliper survey logging of wells, sonar surveys within caverns, and wellbore mechanical integrity testing. The Cavern Integrity program performs annual subsidence surveys of the ground surface of all four sites and maintains the wellheads that cap each well. The brine disposal wells are used to inject brine during crude oil fill operations and to relieve excess cavern pressures.

The program also operates and maintains the DOE-owned Rig Number 155 workover rig on a full-time basis. The rig is inspected annually and maintained with minor repairs as needed. A complete 5-year teardown/inspection and repair of the rig was last performed in CY 2020. The next scheduled 5-year teardown/inspection is scheduled to be conducted again in 2025. A supplemental leased rig will be used if there is sufficient backlog or situations warranting additional capability. A supplemental leased rig was last used in 2021.

The Cavern Integrity Program also perform diagnostic workovers and repairs to the cavern wells with hanging brine strings, well remediations to mitigate severe wellbore deformation, and restore lost wellbore mechanical integrity. During 2022, the SPR PMO oversaw a total of 11 diagnostic workovers at Bayou Choctaw, Big Hill, and West Hackberry Sites. The workovers were all conducted by the DOE-owned rig. The number of workovers and well remediations will vary from year to year depending on regulatory compliance requirements, damaged brine strings, wellbore integrity, and conditions to the brine disposal wells. A dedicated M&O Rig Project Manager and Safety Specialist supervise all rig activities.

Bryan Mound Site Status

The Bryan Mound storage site is located in Brazoria County, Texas, approximately three miles southwest of Freeport, Texas. As of December 31, 2022, the site had 19 operational storage caverns with a total authorized storage capacity of 247.14 MMbbl and a cavern inventory of 176.3 MMbbl.

Big Hill Site Status

The Big Hill storage site is located in Jefferson County, Texas, approximately 26 miles southwest of Beaumont, Texas. As of December 31, 2022, the site had 14 operational storage caverns with a total authorized storage capacity of 170.0 MMbbl and a cavern inventory of 53.4 MMbbl.

In 2022, the 1.5 million barrels of U.S.-produced sweet crude oil purchased by the Government of Australia (GOA) was released in response to an International Energy Agency (IEA) collective action related to Russia's invasion of Ukraine. The GOA does not have any barrels remaining in storage at Big Hill as of December 31, 2022, but the storage lease remains active until both parties mutually agree on termination.

West Hackberry Site Status

The West Hackberry storage site is located in Cameron Parish, Louisiana, approximately 25 miles southwest of Lake Charles, Louisiana. As of December 31, 2022, the site had 21 operational storage caverns with a total authorized storage capacity of 220.38 MMbbl and a cavern inventory of 107.1 MMbbl.

Bayou Choctaw Site Status

The Bayou Choctaw storage site is located in Iberville Parish, Louisiana, approximately 12 miles southwest of Baton Rouge, Louisiana. As of December 31, 2022, the site had 6 operational storage caverns, with a total authorized storage capacity of 76.0 MMbbl and a cavern inventory of 34.0 MMbbl.

St. James Marine Terminal Status

The SPR owns a marine terminal on the Mississippi River in St. James, Louisiana. The facility was built in the late 1970s and began operations in early 1980 primarily to support fill and drawdown of the Weeks Island (decommissioned in November 1999) and Bayou Choctaw SPR sites. The St. James marine terminal has six above ground storage tanks with a total storage capacity of approximately 2 MMbbl. On January 1, 2020, ExxonMobil Pipeline Company (EMPCO) became the new lessee as the tenant operator of the marine terminal. The new lease agreement includes a 10-year base period with two 5-year option periods. EMPCO will provide normal operations and maintenance of the terminal, including supporting the SPR as a sales and distribution point in the event of an SPR drawdown.

The St. James marine terminal, in addition to the ability to support marine transfer operations, has pipeline connections that facilitate crude oil movement to local area markets for further distribution. Direct connections to the Louisiana Capline, LOCAP, and Plains All American Pipeline facilities enhance the SPR's emergency distribution capabilities by enabling unencumbered crude oil distribution.

V. West Hackberry Hurricane Recovery

In CY 2020, the SPR West Hackberry storage site sustained tens of millions of dollars in damage caused by two hurricanes. Both Hurricanes Laura and Delta caused significant damage leaving the site incapable of drawdown. Both site personnel and subcontractors worked to quickly get the site back in an operational condition, but there were millions of dollars of long-term repairs required to fully restore the site. These repairs have continued since the storms and include repairs or replacement to buildings, electrical cabling and components, fencing, lighting, security systems, and spare parts. This initial work will be completed in FY 2024, but additional funding is needed to restore and upgrade the physical security of the site. The Administration included funding for these repairs and upgrades in the FY 2024 budget submitted to Congress.

On August 27, 2020, Hurricane Laura made landfall in Cameron Parish, Louisiana, as a Category 4 hurricane with the eye passing about four miles from the site. It caused significant damage to West Hackberry, leaving the site incapable of drawdown. An initial assessment conducted of the hurricane damages noted large amounts of debris and damages to fences, lighting/power poles, cabling and cable trays, security equipment, multiple buildings, complete destruction of the Spare Parts Warehouse and loss of many spare parts, loss of commercial power, and loss of potable water and sewerage treatment services.

VI. SPR Modernization Program – Life Extension Phase 2 Project

In 2015, the SPR commenced a program that involved all four SPR storage sites that replaced or upgraded equipment and facilities that approached or already exceeded the projected 25-year life span. This commencement occurred with the signing of Critical Decision-0 (CD-0), Approve Mission Need, in accordance with DOE Order 413.3B, Program and Project Management for the Acquisition of Capital Assets. CD-1, Approve Alternative Selection and Cost Range was approved in December 2016 with a cost range of $750 million to $1.4 billion. In 2018, design efforts continued and procurement of Long Lead Government Furnished equipment began. In 2020, LE2 efforts continued with the assumption of the architect-engineer (A-E) scope by the M&O contractor. In 2020, the SPR's major accomplishment for the LE2 project included a fourth wave of Long Lead Procurement (CD-3C/3D) with an estimated value of $76.5 million.

In 2021, the M&O Contractor, FFPO, completed Title II design in Houston, Texas, with design reviews and 3D model reviews being conducted virtually and remotely. However, budget overruns were discovered in the External Independent Review (EIR) with the Office of Project Management. To move the project back to the $1.4 billion budget level approved at CD-1, the design team began a project de-scoping effort. Most significantly, the Project Management Executive approved removal of the 16 secondary cavern wells at West Hackberry from the project as well as the Site-Wide Wi-Fi scope. This reduced project scope by over $450 million and necessitated only a small amount of additional de-descoping. Choosing this course of action had the advantage of leaving nearly the entire planned suite of upgrades and improvements intact (except for the West Hackberry secondary wells) and will accomplish the original goal of preparing the SPR for the next 20–25 years. Critical Decision-2/3 (CD-2/3) was approved in June 2021 for Bryan Mound, Big Hill, and Bayou Choctaw. The Critical Decision-4 (CD-4) dates for Bryan Mound, Big Hill, and Bayou Choctaw are January 2026, August 2026, and January 2025, respectively. An Office of Project Management-led EIR will be scheduled for West Hackberry between December 2022 and March 2023. Early works field subcontracts have been awarded at three of the four sites.

Through the interaction and the cooperation between the Office of Project Management and the Integrated Project Team (IPT), certification of an Earned Value Management System (EVMS) for the projects was approved on August 10, 2022.

VII. Petroleum Acquisition

Oil Acquisition Market Assessments

Procedures for the acquisition of petroleum for the SPR are found in Title 10 of the Code of Federal Regulations Part 626 (10 CFR Part 626). These procedures require performance of a market assessment to ensure SPR acquisition activities will not unduly impact current market conditions.

Crude Oil Exchange

In response to a lack of crude oil supply due to Hurricane Ida, the SPR negotiated with impacted customers and commenced an emergency exchange of SPR crude oil in September 2021. The total barrels shipped in response was 3.29 MMbbl from September 10, 2021, through September 29, 2021. These barrels were initially expected to be returned to the SPR in CY 2022, but the Presidentially declared 180 MMbbl drawdown has pushed these returns to CY 2023.

The SPR initiated the FY 2022 Winter Exchange, which started December 16, 2021. The purpose was to supplement the crude oil market with additional supply, while adding to the SPR inventory in subsequent years. From January 1, 2022, through June 28, 2022, the SPR delivered 20.22 MMbbl over 45 shipments to its FY 2022 Winter Exchange partners. Previously, in December 2021, the SPR delivered 3.9 million barrels to ExxonMobil and 0.250 million barrels to Marathon Oil as part of the Winter Exchange program designed to reduce the impacts of high crude oil prices on the refined petroleum products markets. Due to the scope of this program, the exchange barrels are anticipated to be returned in CY 2024 and 2025.

The SPR, in response to the Keystone Pipeline leak, entered into an emergency exchange for 1.8 MMbbl in December 2022. A total of 1.79 MMbbl over 4 cargoes were delivered in CY 2022. These barrels are anticipated to be returned starting in June 2024 and January 2025.

Crude Oil Inventory Status

As of December 31, 2022, the SPR's crude oil inventory was 372.1 MMbbl, a decrease of 221.6 MMbbl from the end of CY 2021. The net decrease resulted from conducting one legislatively mandated crude oil sale, the 2022 Winter Exchange in CY 2022, Presidentially authorized emergency sales in response to Russia's invasion of Ukraine totaling over 180 MMbbl, the drawdown of barrels held for the GOA, and the Keystone Exchange.

Fill of Reserve

Detailed information about the SPR's fill program since 1977 can be found in:

- **Table 2: Year-End Inventories and Oil Fill History**, lists year-end inventories and average daily fill rates for the years 1977–2022 (by FY and CY)
- **Table 3: Crude Oil Receipts (As of December 31, 2022),** lists crude oil receipts by country of origin since 1977
- **Table 4: Crude Oil Inventory (As of December 31, 2022),** identifies the location of the inventory by storage site, and Figure 3 illustrates the cumulative oil fill by year

Table 2. Year-End Physical Inventories and Oil Fill History

	FISCAL YEAR		CALENDAR YEAR	
	Year-End Inventory (MMbbl)	Average Daily Fill Rate[1] (Mbbl/d)	Year-End Inventory (MMbbl)	Average Daily Fill Rate[1] (Mbbl/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	(58)	568.5	(47)
1992	571.4	8	574.7	17
1993	585.7	39	587.1	34
1994	591.7	16	591.7	13
1995	591.7	*[2]	591.6	*[2]
1996	573.6	(49)	565.8	(70)
1997	563.4	(28)	563.4	(7)
1998	563.4	*[2]	561.1	(6)[3]
1999	564.9	4	567.0	16
2000	570.3	15	540.7	(72)[4]
2001	544.8	(70)[4]	550.2	26
2002	587.2	116	599.1	134
2003	624.4	102	638.4	108
2004	670.3	126[5]	675.6	102[5]
2005	693.7	64[6]	684.5	25[6]
2006	687.8	(16)[7]	688.6	11[7]
2007	692.8	14	696.9	23
2008	702.4	26[8]	701.8	13[8]
2009	725.1	62.2	726.6	67.9
2010	726.5	3.8	726.5	(0.2)[9]
2011	695.9	(84)[10]	695.9	(84)[10]
2012	694.9	(3)[11]	695.3	(2)[11]
2013	696.0	3	696.0	2
2014	691.0	(13.6)[12]	691.0	(13.6)[12]
2015	695.1	11.2	695.1	11.2
2016	695.1	0	695.1	0
2017	673.8	(58.4) [13]	662.8	(88.5) [14]
2018	660.0	(37.8) [15]	649.1	(37.53)

	FISCAL YEAR		CALENDAR YEAR	
	Year-End Inventory (MMbbl)	Average Daily Fill Rate[1] (Mbbl/d)	Year-End Inventory (MMbbl)	Average Daily Fill Rate[1] (Mbbl/d)
2019	644.8	(41.6)[16]	635.0	(38.9)[17]
2020	642.2	(7.1)[18]	638.1	8.5[18]
2021	617.8	(66.8)[19]	593.7	(121.4)[20]
2022	416.4	(551.8)[21]	372.1	(607.1)[22]

MMbbl = Million Barrels Mbbl/d = Thousand Barrels per day ( ) = Denotes a Reduction

1. Fill rates adjusted for oil sales
2. Fill suspended during this period
3. Decrease due to Maya exchange
4. Net decrease due to Exchange 2000
5. Net Hurricane Ivan deliveries and receipts
6. Net Hurricane Ivan receipts & Katrina deliveries
7. Net Hurricane Katrina exchange and drawdown sales
8. Net Hurricanes Gustav & Ike deliveries
9. West Hackberry/Bayou Choctaw Exchange oil costs and degas loss
10. Drawdown 2011
11. Hurricane Isaac Exchange
12. Test Sale 2014
13. FY17 21st Century Cures, FY17 SPR Modernization, Hurricane Harvey Exchange
14. FY18 Mandatory Sale, Harvey Exchange
15. FY18 Mandatory Sale, FY18 Modernization Sale, Harvey Exchange Returns
16. FY19 Mandatory Sale, FY19 Modernization Sale
17. FY19 Modernization Sale, FY20 Mandatory Sale
18. FY20 Mandatory Sale, FY20 Exchange for Storage
19. FY20 Exchange for Storage, FY21 Mandatory Sale, FY21 Modernization Sale, Ida Exchange
20. FY20 Exchange for Storage, FY21 Modernization Sale, FY21 Mandatory Sale, Ida Exchange, FY22 Mandatory Sale, FY22 Winter Exchange
21. FY22 Mandatory Sale, FY22 Winter Exchange, FY22 Winter Sale, GOA DD, Presidential DD
22. FY22 Winter Exchange, FY22 Winter Sale, GOA DD, Presidential Drawdown, FY23 Keystone Exchange

Table 3. Crude Oil Receipts (As of December 31, 2022)

Source Country	Cumulative (MMbbl)	Percent of Total (%)
Mexico	266.3	30.0
United Kingdom	193.9	21.9
United States*	139.8	15.7
Saudi Arabia	28.3	3.2
Libya	27.5	3.1
Venezuela	25.3	2.9
Angola	25.1	2.8
Russia	25.1	2.8
Iran****	20.0	2.3
United Arab Emirates	19.3	2.2

Source Country	Cumulative (MMbbl)	Percent of Total (%)
Nigeria	16.3	1.8
Algeria	15.7	1.8
Cameroon	15.1	1.7
Equatorial Guinea	15.1	1.7
Norway	14.0	1.6
Oman	12.9	1.5
Egypt	8.9	1.0
Ecuador	6.2	0.7
Iraq	3.4	0.4
Gabon	2.4	0.3
Qatar	2.3	0.3
Azerbaijan	2.1	0.2
Columbia	1.2	0.1
Argentina	0.4	0.0
Ivory Coast	0.4	0.0
Peru	0.4	0.0
Total**	887.4	100.0

MMbbl = Million Barrels

* Included receipts from Gulf of Mexico offshore production.

** Totals do not add due to rounding.

*** Cumulative total receipts unadjusted for sales and operational gains and losses.

**** Prior to 1995.

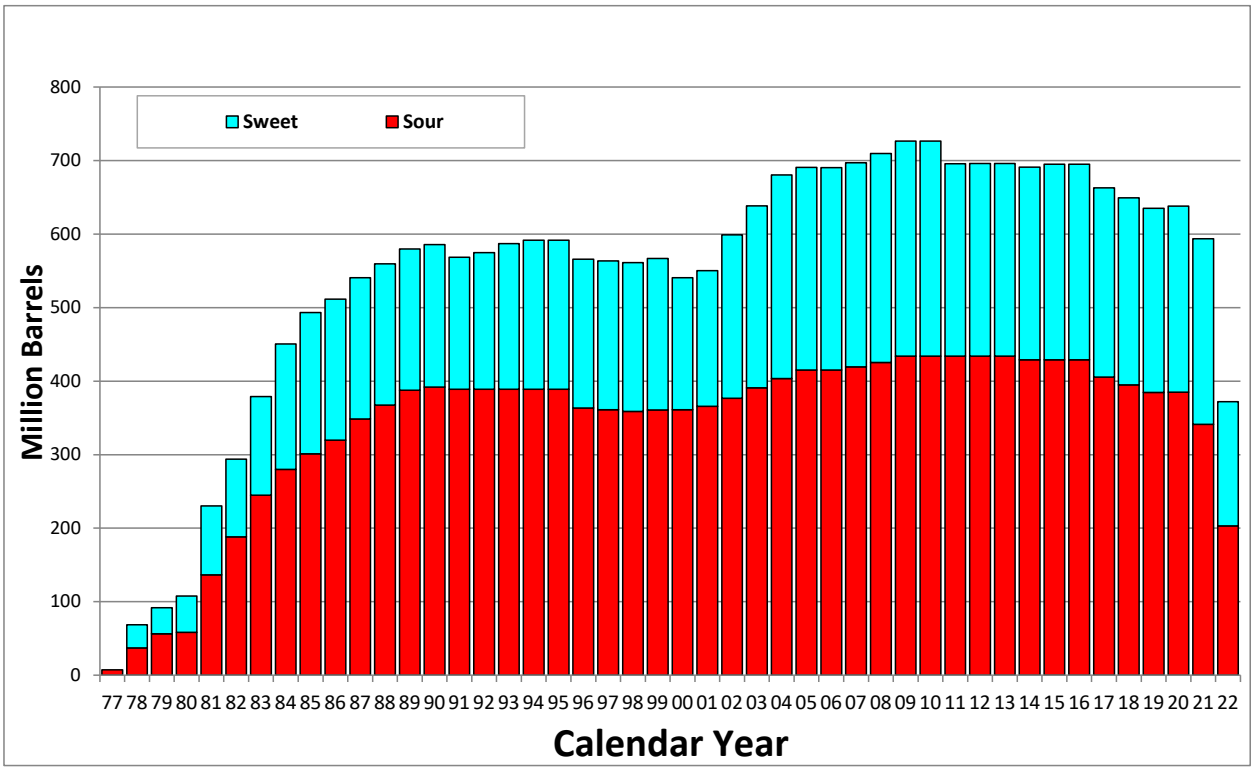
Table 4. Crude Oil Inventory (As of December 31, 2022)

Storage Site	Inventory (MMbbl)		
	Sweet*	Sour**	Total***
Bryan Mound, Brazoria County, Texas	66.6	109.6	176.3
Big Hill, Jefferson County, Texas	33.0	20.4	53.4
West Hackberry, Cameron Parish, Louisiana	67.1	40.0	107.1
Bayou Choctaw, Iberville Parish, Louisiana	1.1	32.9	34.0
Subtotal Underground Inventory	167.8	202.9	370.7
Tanks and Pipelines	1.2	.1	1.3

Storage Site	Inventory (MMbbl)		
	Sweet*	Sour**	Total***
Total Inventory	169.1	203.0	372.1
Total Crude Oil Accounts Payable	0	0	0
Total Crude Oil Accounts Receivable	3.6	26.6	30.3
Total SPR Book Inventory	172.7	229.6	402.4

MMbbl = Million Barrels
* Sulfur content not exceeding 0.5 percent, by mass; API gravity range: 30 – 45 degrees.
** Sulfur content greater than 0.5 percent and less than 2.0 percent, by mass; API gravity range: 30 – 45 degrees.
*** Totals do not add due to rounding.

Figure 3. Cumulative Oil Fill



VIII. Emergency Response Capabilities

Sale of Oil

Section 161 of EPCA gives authority to the President under specified conditions to direct the Secretary of Energy to conduct a public sale of oil from the SPR. The SPR Project Management Office (SPR PMO) awards contracts based on the best value to the government.

Competitive Sales Procedures

DOE regulations in 10 CFR 625 govern the process for price-competitive sales from the SPR, including the establishment of Standard Sales Provisions for use in SPR sales contracts. The first step in the process is to issue a Notice of Sale identifying the volume, characteristics, and location of the petroleum for sale. The Notice of Sale also provides delivery dates and the requirements to successfully submit offers, as well as measures required for assuring performance and financial responsibilities.

During a drawdown, the SPR PMO may issue multiple Notices of Sale using a web-based automated oil sales and evaluation system. Each Notice of Sale covers a sales period of 1 to 3 months. Offerors may have five days or less from the date a Notice of Sale is issued until offers are due. Delivery of oil could commence as soon as 13 days after the President calls for a drawdown of the SPR. Subsequent sale periods, if necessary, will correlate with standard industry delivery periods. Because of the possible short initial lead time, DOE maintains a registry of prospective offerors who will receive electronic notification of all Notices of Sale.

The second step in the sales process is for prospective purchasers to submit offers, as specified in the Notice of Sale. Offerors must unconditionally accept all terms and conditions in the Notice of Sale and submit an offer guarantee of 5 percent of the maximum potential contract amount, or $10 million—whichever is less. The offer evaluation process provides for offerors who bid the highest prices to determine the transportation methods, up to the limits of the distribution system. Negotiations on specific delivery arrangements to the SPR happen later in the process.

Within five business days of notification, all “apparently successful offerors” must provide a Letter of Credit equal to 100 percent of the contract amount as a guarantee of performance and payment of amounts due under the contract. Upon timely receipt of the financial guarantees, and a final determination by the Contracting Officer that offers are responsive and the selected offerors are financially responsible, the SPR will issue Notices of Award. Deliveries to the purchasers then begin, consistent with the purchasers’ arrangements for commercial pipeline or marine vessel transportation.

Following delivery, the SPR PMO invoices the purchaser for actual barrels received at a price that reflects the market indexed contract award price, plus any adjustments for quality

differentials, delivery mode, or location changes. Payment is due in the month following the delivery.

Drawdown Capabilities[2]

Crude oil acquired for the SPR is commingled in caverns at the storage sites, creating various distinct crude oil streams available for release. Table 5 identifies these crude oil streams, delivery modes, and locations.

The design drawdown rate is 4.415 MMbbl/d, however due to inventory levels as of December 31, 2022, the maximum sustained drawdown rate is 2.26 MMbbl/d over a 90-day period. The drawdown rate gradually decreases as site inventories decline and a lower number of caverns containing crude oil becomes a constraint. The actual distribution rate may also be substantially lower than operational drawdown rate due to downstream considerations, such as possible limitations on the market's ability to accept oil at a given moment in time, or capacity limitations on non-DOE owned infrastructure.

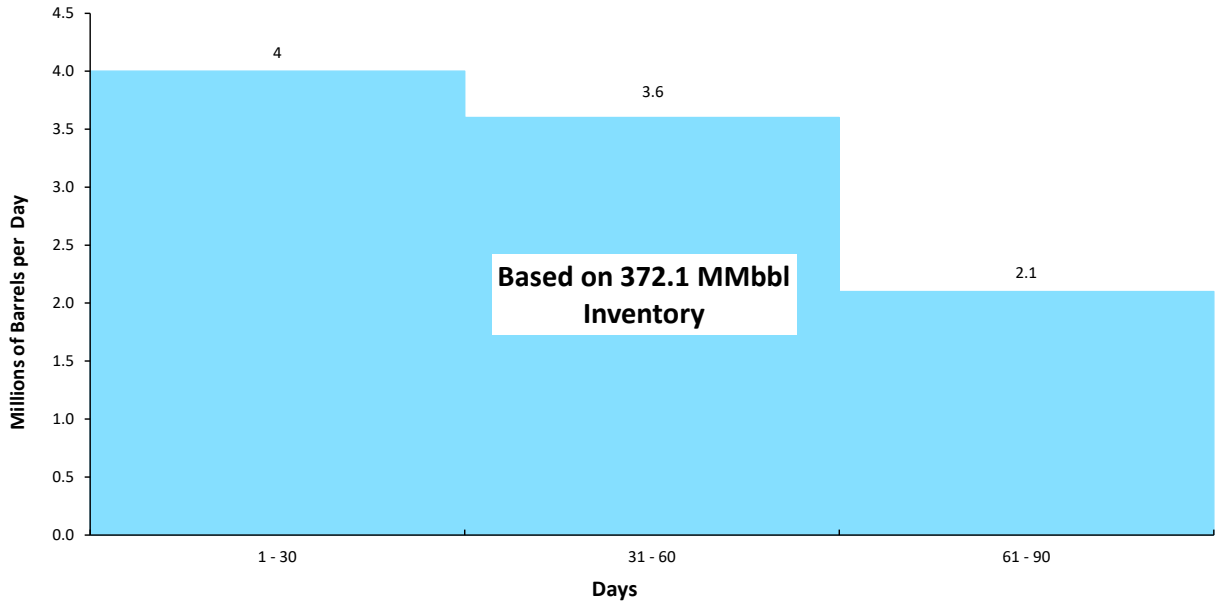
Table 5. Crude Oil Streams (As of December 31, 2022)

Crude Oil Stream	Gravity (°API)	Sulfur Content (Mass %)	Delivery Mode and Location
Seaway System			
Bryan Mound (Sweet)	36.5	0.37	Pipeline at Jones Creek Tank Farm, Jones Creek, Texas; Tankship at Seaway (Enterprise Products) Terminals, Freeport and Texas City, Texas; Genesis Terminal, Texas City, Texas
Bryan Mound (Sour)	33.3	1.40	
Texoma System			
West Hackberry (Sweet)	36.8	0.34	Pipeline, tankship, or barge at Sun Partners Marketing & Terminals LP, Nederland, Texas; Pipeline at Zydeco-22"/DOE connection, Lake Charles, Louisiana
West Hackberry (Sour)	33.0	1.49	
Big Hill (Sweet)	35.6	0.41	Pipeline, tankship, or barge at Sun Partners Marketing & Terminals LP, Nederland, Texas; Pipeline or tankship at Phillips 66 Terminal, Nederland, Texas; Pipeline at Zydeco-20"/DOE connection, Winnie, Texas
Big Hill (Sour)	30.8	1.43	
Capline System			
Bayou Choctaw (Sweet)	35.3	0.42	Pipeline at Plains Marketing LOCAP Terminals, St. James, Louisiana; Tankship at Sugarland St. James Terminal, St. James, Louisiana; 24-inch site connection to Placid Bourre Pipeline, Iberville Parish, Louisiana
Bayou Choctaw (Sour)	31.9	1.43	

[2] This refers to the ability to displace oil out of the SPR caverns without considering whether the downstream distribution of the oil to SPR customers would accommodate that much oil being pumped out of the SPR caverns.

Figure 4 illustrates the SPR's operational 90-day drawdown capabilities during 2022, with an inventory of 372.1 MMbbl. These rates can only be achieved if the market has the ability and/or capacity to accept SPR crude oil at designated rates seen below.

Figure 4. Operational Drawdown Capability (As of December 31, 2022)



Drawdown Readiness Activities

Below is a list of the SPR drawdown readiness assurance activities performed during CY 2022:

- The Drawdown Readiness Review Program requires and monitors quarterly drawdown readiness. The SPR PMO conducted four reviews in 2022, confirming preparation of all sites and systems for an SPR crude oil drawdown or exchange.

- On a quarterly basis as a part of the Drawdown Readiness Review Program, the SPR PMO publishes Readiness and Capability (RECAP), Reliability Availability Maintainability (RAM) and SPR Exchange Readiness and Capability (SPREX) Reports, along with an update to Drawdown Configuration charts.

- The Systems Test Exercise (STE) program assists in validating the drawdown readiness of an SPR site's equipment, procedures, systems, and personnel and collects data to support readiness status. The STE program is multifaceted and involves either a tabletop exercise or a dynamic test performed at each site, which are critical for illustrating SPR site capability if there are no fluid movements in the period(s).

Distribution Capabilities

The substantial increase in both Canadian and U.S. domestic production has had a significant impact on both the magnitude and spatial disposition of crude oil supply over the past decade. Though several other regions of the country have emerged as significant supply centers, the Gulf Coast remains a major refining and transshipment destination for crude oil. As a result, the use of oil distribution infrastructure has changed significantly. Through 2011, most major pipelines originated in the Gulf Coast region and provided crude oil to local refineries and Midwest refiners. Since then, several major pipelines have reversed direction and are now flowing crude to U.S. Gulf Coast refining centers, thereby reducing the need for imports.

In 2012, the SPR lost connectivity to 10 refineries in the central part of the U.S. with the reversal of the Seaway Pipeline's flow direction. The Seaway Pipeline now flows from Cushing, Oklahoma, to Freeport, Texas. In December 2013, Shell reversed a section of one of the pipeline systems, now referred to as the Zydeco Pipeline, to flow eastbound from Houston, Texas, to the Louisiana Offshore Oil Port's terminal in Clovelly, Louisiana. As a result, the SPR's Big Hill site lost connectivity to Houston area refineries, reducing the number of potential buyers that can receive SPR oil by pipeline. The flow of oil eastward now connects the SPR to refineries previously unable to receive pipeline deliveries from the SPR. Refineries along the Mississippi River, such as PBF Energy Chalmette, Shell Norco, Valero Norco, and Valero Meraux, can now receive pipeline deliveries from the SPR.

Due to changing market conditions, the Capline pipeline was shut in during CY 2019 to begin the process of reversing the flow direction from northbound to southbound. As a result of this decision by the pipeline owners, the SPR lost pipeline connectivity to nine Midwestern refineries. Southbound Capline operations, originating in Patoka, Illinois, and ending at the Capline terminal in St. James, Louisiana, commenced in December 2021.

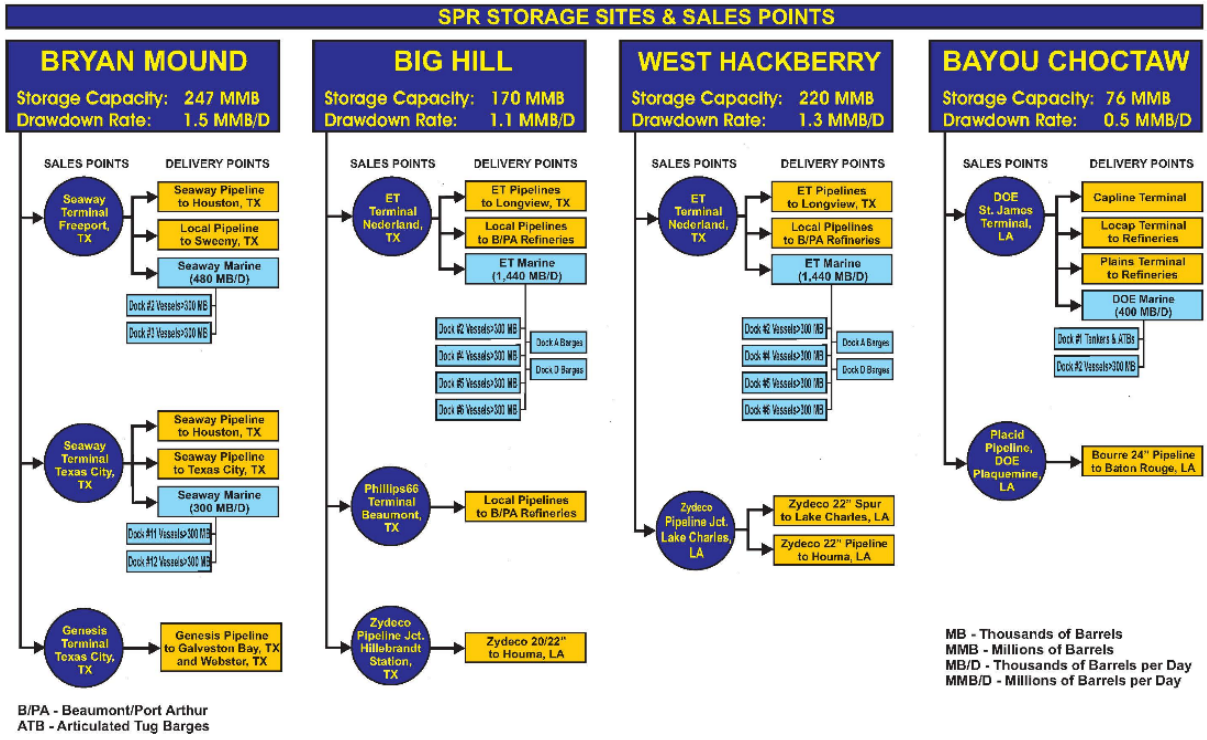
At the end of CY 2022, commercial pipeline systems connected the SPR to 31 refineries, accounting for 45 percent of total U.S. refinery operable capacity.

The SPR also connects to three marine terminals that have a combined contracted marine distribution capacity of 2.220 MMbbl/d (million barrels per day), and it owns one marine terminal with a distribution capacity of 400 Mbbl/d (thousand barrels per day). These marine terminals are Seaway Terminal (Enterprise Products), Freeport, Texas; Seaway Terminal (Enterprise Products), Texas City, Texas; Energy Transfer Terminal, Nederland, Texas; and the DOE-owned, St. James Terminal, St. James, Louisiana. EMPCO assumed lease operations at the DOE owned St. James, Louisiana marine terminal by taking over the facility at the beginning of CY 2020. Figure 5 illustrates the SPR's pipeline and marine distribution capabilities.

The crude oil pipeline from Bryan Mound to Seaway Terminal (Jones Creek) is temporarily out-of-service due to water undermining the soil beneath the pipeline. The undermining occurred at the pipeline's Brazos River crossing during Hurricane Harvey in August and September 2017.

Repair method selection and design are ongoing with construction of a new line anticipated to start in FY 2024. This pipeline does not presently impact design drawdown capability of the Bryan Mound site. This DOE-owned pipeline is currently leased to EMPCO, who is responsible for the repair.

Figure 5. Pipeline and Marine Design Distribution Capabilities



Distribution Assessment

The SPR performs an annual distribution assessment based on established technical and performance criteria. The assessment evaluates the SPR's crude oil distribution system capabilities for adequate connections to commercial distribution systems and to identify the need for workarounds if capability is lacking in any areas. The 2022 Distribution Assessment Report (August 2022) evaluated the SPR's distribution capability at a sustained drawdown rate to replace oil imported during the base year (2021) and in future years as well (2025, 2030, 2035, and 2040).

CY 2021 is the base year due to the timing of the distribution report, which relies on the most recently finalized refinery oil import demand data (CY 2021) as well as CY 2021 petroleum data from U.S. Energy Information Administration's (EIA) Annual Energy Outlook 2022.

Level I Technical and Performance Criteria[3] governing the SPR's distribution capabilities requires that the physical distribution system infrastructure—both DOE-owned and commercial—is capable of distribution rates exceeding 120 percent[4] of the combined site drawdown rates to provide sufficient allowances for terminal operational delays and commercial demand variances. The SPR measures performance in this area via the Distribution Capability performance measure.[5] This performance measure can be calculated for the SPR distribution system as a whole or by the three individual distribution systems. The performance measure can also be calculated at various points in time.

The distribution assessment and the results summarized below are based on a study of the physical distribution capacity, which is the total capacity of all physical connections from SPR storage sites to commercial pipelines and marine terminals, including the DOE-owned St. James marine terminal. It assumes that during a commercial supply disruption, the SPR is capable of using 100 percent of contractual terminal services to move oil from the DOE pipelines to contracted marine terminals, the St. James marine terminal or to third-party pipelines via the contracted terminal's existing connections. The assumption provides a best-case situation and is unlikely to reflect actual distribution capability during an emergency oil disruption event.

Base-Year Assessment

The base year assessment indicates that none of the three SPR crude oil distribution systems were compliant with Level I Performance Criteria. However, the distribution system has enough capacity to meet disruption levels as have been experienced in the past. The Level I Performance criteria for the aggregated total SPR has remained below 120 percent for eight years in a row, as a result of increased domestic production, petroleum infrastructure additions by the private sector, commercial pipeline reversals and the resulting marine terminal and pipeline congestions. Table 6 provides the performance measures for the base and previous year.

However, it must be stated that the SPR fulfilled its mission to provide crude oil during a severe energy supply disruption in CY 2022 caused by the Russian invasion of Ukraine. By this measure, the SPR's distribution capability was up to the task, distributing over 200 million barrels of crude oil in response to this disruption.

[3] Establishes the SPR top-level technical and performance criteria for design, construction, performance, and testing.

[4] "The Strategic Petroleum Reserve, A Report on the Capability to Distribute SPR Oil," National Petroleum Council (December 1984), states: "A level of [distribution] redundancy of approximately 20 percent was assumed as an allowance for refinery demand variances, terminal operation delays, and other factors."

[5] The Distribution Capability performance measure is calculated using the ratio of the SPR physical distribution capability (defined as interstate pipeline non-Canadian crude oil import demand plus locally connected refinery non-Canadian crude oil import demand plus SPR marine terminal capacity) divided by the SPR Operational Drawdown rate.

Table 6. Base-Year Distribution Assessment

System	Sustained Drawdown Rate (Mbbl/d)	Physical Distribution Capability (Mbbl/d)	Performance Measure As of 12/31/2021	Performance Measure As of 12/31/2020
Seaway	1,500	1,164	78%	83%
Texoma	2,400	2,015	84%	82%
Capline	515	480	93%	99%
Total	4,415	3,659	83%	84%

Mbbl/d = Thousand Barrels per day

Future Year Assessments

For future years 2025, 2030, 2035, and 2040, the SPR performed an assessment from the 2021 perspective using the U.S. petroleum refining supply and demand projections from the EIA's Annual Energy Outlook 2022. One of the key issues facing the SPR is the additional congressionally mandated sales of approximately 240.5 MMbbl (this volume already accounts for the cancellation of 140 million barrels of sales in FY 2024 through FY 2027 in exchange for a recission of $10.4 billion from the SPR Petroleum Account, with the money coming from revenue earned from emergency sales in 2022) of crude oil between FY 2017 and FY 2031 and the impact of these sales on drawdown rates and final configuration of the SPR storage sites. Due to reduced inventory within the caverns at each operational storage site, the SPR sustained drawdown rate over a 90-day period is already below 4.415 MMbbl/d, as shown in Table 1 above.

Based on the Annual Energy Outlook 2022 projections for U.S. petroleum imports, the Distribution Assessment concluded that the distribution capability of the SPR will fall below Level I Performance Criteria in the out years for all three distribution systems. The SPR's Level I performance measure for distribution is an important indicator of sufficient private sector commercial pipeline and marine terminal capacity to distribute SPR crude oil at the SPR sustained drawdown rate over a 90-day period. Table 7 provides the performance measures by distribution system for each forecast period.

Table 7. Forecasted Performance Measures

System	2025	2030	2035	2040
Seaway	78%	83%	87%	82%
Texoma	74%	71%	75%	76%
Capline	92%	87%	91%	98%
Total	77%	77%	81%	81%

International Energy Program Requirements

The U.S., as a member of the IEA, is obligated to maintain stocks of crude oil and products in reserves that are equivalent to 90 days of net oil imports. Computations of IEA member nations' stockpile requirements are based on both publicly and privately held stocks, and net imports are defined as the average daily level in the previous year. The U.S. is, and has always been, in compliance with this requirement. As a net petroleum exporter in 2022, officially the U.S. had no obligation to hold inventory to meet this requirement.

However, each IEA country has another obligation. In the event of a petroleum supply reduction, the IEA Governing Board may choose to collectively release oil stocks to respond to the crisis. In a coordinated IEA response, each member country is responsible for a share of the total release that is proportionate to that Nation's share of total IEA oil consumption. For the U.S., this share was 42.3 percent as of December 2022.

IX. Commercial Activities

Commercial Leases

By design and purpose, the SPR's infrastructure is for emergency use. In between periods of emergency use, SPR's infrastructure is underutilized. The SPR has commercialized underutilized crude oil distribution facilities to be more cost-effective, leasing three crude oil pipelines and a marine terminal to private industry. The contracts for these leases require that the facilities be maintained in good condition, and, in the event of a presidentially ordered emergency drawdown, use of the leased facilities will be returned to DOE within 5 days following notification. Receipts from the leases go to the U.S. Treasury.

During CY 2022, receipts to the General Fund of the U.S. Treasury from the commercial leases of the SPR's distribution facilities and pipelines totaled $9,641,443.32. Table 8 summarizes commercial revenues from 1996–2022.

Bayou Choctaw Pipeline

Pursuant to the new lease with EMPCO, the Bayou Choctaw pipeline is now under the general lease of the St. James Facility. In the early 1990s, the SPR determined that leasing the Bayou Choctaw pipeline would be advantageous to the U.S. government and in the public's interest because it would eliminate operating costs for the government and provide a means to generate revenue. Total lease payments in FY 2022 for both the pipeline and the St. James Facility totaled about $2.2 million.

St. James Marine Terminal

In 2022, St. James Marine Terminal lease revenue was $3,006,562.65. EMPCO was awarded the lease agreement for the terminal in June 2019, on a revenue-sharing basis with an effective date of January 1, 2020, for 10 years with two 5-year options.

Bryan Mound Pipelines

In 2022, lease revenues totaled $6,634,880.67. EMPCO leased two of the three Bryan Mound pipelines on January 14, 1999, and began using the pipelines in June 2000 as part of its onshore distribution system for the Diana Hoover production in the Gulf of Mexico. This lease extends for a term of 10 years and will expire on May 31, 2030. The extension supports the lessee time for repair and replacement of the Bryan Mound to Jones Creek pipeline, removal of the damaged pipeline segment and provides the opportunity to mitigate any potential loss of revenue.

Table 8. Summary of Commercial Revenues (December 31, 2022)

Calendar Year	Bryan Mound Pipelines (Actual $)	Big Hill Pipeline (Actual $)	Bayou Choctaw Pipeline (Actual $)	St. James Terminal Lease (Actual $)	Total Revenue Generated (Actual $)
1996	102,606	472,809	0	0	575,415
1997	0	429,824	0	133,300	563,124
1998	12,500	402,525	0	481,010	896,035
1999	679,393	400,000	163,030	546,125	1,788,548
2000	652,146	493,359	217,573	748,986	2,112,064
2001	1,054,297	33,104	212,738	1,227,021	2,527,160
2002	1,468,613	0	249,708	1,285,183	3,003,504
2003	1,647,828	0	168,718	1,863,060	3,679,606
2004	1,546,121	0	174,338	1,700,000	3,420,459
2005	1,132,668	0	730,542	1,700,000	3,563,210
2006	1,091,799	0	337,949	1,700,000	3,129,748
2007	1,128,340	0	218,912	1,700,000	3,047,252
2008	1,211,171	0	321,799	1,700,000	3,232,970
2009	1,141,228	0	232,374	1,700,000	3,073,602
2010	1,091,494	0	169,541	1,700,000	2,961,035
2011	2,124,218	0	318,183	1,700,000	4,142,401
2012	5,838,356	0	312,481	1,700,000	7,850,837
2013	17,270,421	0	274,481	1,975,000	19,519,902
2014	6,513,476	0	188,695	2,000,000	8,703,171
2015	11,243,574	0	236,583	2,000,000	13,480,157
2016	3,902,442	0	360,500	2,000,000	6,262,942
2017	2,564,390	0	462,525	2,000,000	5,026,915
2018	2,523,452	0	182,535	2,000,000	4,705,987
2019	3,229,584	0	164,544	2,000,000	5,394,128
2020	3,019,598	0	11,000	1,976,236	5,006,834
2021	4,173,455	0	0	2,113,254	6,286,709
2022	6,634,880.67	0	0	3,006,562.65	9,641,443.32

X. Budget and Finance

With enactment of the Consolidated Appropriations Act, 2022 (Public Law 117-103), Congress appropriated $197 million for the SPR and $22 million for the NGSR. Congress appropriated an additional $7.35 million to the SPR Petroleum Account for the cost associated with conducting crude oil sales. Remaining costs for conducting crude oil sales in 2022 were financed by carryover in the SPR Petroleum Account and by revenue earned from the over 180 million barrels of emergency sales conducted in CY 2022. In total, the SPR earned nearly $17 billion in revenue from the emergency sales.

Appropriations through Fiscal Year 2022

Over the history of the SPR, Congress has appropriated a total amount of $25.5 billion, net of sales and transfers, for the SPR through FY 2022. Table 9 describes the distribution of this annual appropriation.

Table 9. Appropriations for Storage Facilities Operations and Management and Petroleum Account*
(As of December 31, 2022)

Fiscal Year	Oil Account ($000)	Facilities ($000)	Management ($000)	Expansion ($000)	Total ($000)	Defense SPR ($000)
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	
Total 1979 Appropriations*	2,356,456	632,504	18,111		3,007,071	
Total 1980 Appropriations*	(2,022,272)	0	22,272		(2,000,000)	
Total 1981 Appropriations*	3,205,094	108,168	19,391		3,332,653	
Total 1982 Appropriations*	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	17,890		2,508,740	
Total 1986*	(12,964)	106,979	13,518		107,533	
1987	0	134,021	13,412		147,433	
1988	438,744	151,88	12,276		602,906	
1989	242,000	160,021	13,400		415,421	
1990	371,916	179,530	12,953		564,399	
1991	566,318	187,728	12,846		766,892	
1992	88,413	171,678	13,384		273,475	
1993	(125,625	161,940	14,227		50,542	

Fiscal Year	Oil Account ($000)	Facilities ($000)	Management ($000)	Expansion ($000)	Total ($000)	Defense SPR ($000)
DOD Transfer (non-add)	124,925	700	0		125,625	125,625
1994	0	191,035	15,775		206,810	
1995	(107,764)	226,938	16,780		135,954	
1996 transfer from SPR Petro Acct	(187,000)	170,173	16,827		0	
1996 Weeks Island Oil Sale	(97,114)	97,114	0		0	
1996 deficit reduction oil sale	(227,000)	0	0		(227,000)	
1996 Total	(511,114)	267,287	16,827		(227,000)	
1997 Total*	(220,000)	193,000	16,000		(11,000)	
1998	0	191,500	16,000		207,500	
1999	0	145,120	14,805		159,925	
2000	0	144,000	15,000		159,000	
2001	0	140,672	15,965		156,637	
2002	0	154,009	16,871		170,880	
2003	1,955	157,823	13,909		173,687	
2004	0	155,044	15,904		170,948	
2005*	43,000	109,946	16,764		169,710	
2006*	(43,000)	190,510**	16,830		207,340	
2007	0	146,950	17,491		164,441	
2008		143,980	18,004	24,773	186,757	
2009	(21,586)	176,255***	18,824	31,507	226,586	
2010	0	199,732	19,091	25,000	243,823	
2011	0	186,873	22,568	0	209,441	
2012*	0	172,914	19,790	0	192,704	
2013*	0	162,975	19,650	0	182,625	
2014*	0	167,514	21,846		189,360	
2015		174,999	25,001		200,000	
2016	0	186,870	25,130		212,000	
2017	0	195,646	27,354	0	223,000	
2018	8,400	232,630****	28,086	0	269,116	
2019	10,000	209,026	25,974	0	245,000	
2020	10,000	168,235	26,765	0	205,000	
2021	1,000	163,980	24,020	0	189,000	
2022	7,350	192,736 *****	26,264	0	226,350	

Note: FY 1991 SPR Petroleum Account of $566,318 includes proceeds of $122,681 from the Test Sale recorded as additional budget authority, rather than reductions to obligations, costs, and outlays. It also includes $315,425 in Desert Storm Drawdown proceeds from January 1991, and $19,755, from FY 1991 Naval Petroleum Reserve excess receipts. Thus, the cumulative budget authority is "gross" and not related directly to the inventory of oil on hand.

* Includes reprogramming, rescission, and transfer actions.

** Includes the return of $43,000,000 from the SPR Petroleum Account.

*** Includes $21,586 from the SPR Petroleum Account for site maintenance activities.

**** Includes $194,914 for operations, $29,000,000 for NGSR, and $8,716 for disaster recovery.

***** Includes $22,000,000 for NGSR.

SPR Account and SPR Petroleum Account

The SPR Account funds the development, operation, and maintenance of facilities; the salaries and expenses necessary to plan and manage the program, including the operation of the SPR PMO in New Orleans, Louisiana; and the activities pertinent to major issues concerning the development and use of the SPR.

Obligations for the SPR Account in FY 2022 totaled approximately $227.6 million. From this amount, $26.2 million funded Federal program management, and $177.7 million funded contractual goods and services to operate and maintain the SPR.

Funding support for the NGSR also comes from within the SPR Account. For FY 2022, NGSR storage and administrative oversight costs totaled $23.7.

SPR Petroleum Account

The SPR Petroleum Account funds the acquisition and withdrawal of oil for the SPR; the associated costs for transportation and terminal expenses, U.S. customs duties, Superfund and Oil Spill Liabilities Trust Fund taxes; and other miscellaneous costs related to oil movements.

During an emergency drawdown and sale, as well as congressionally mandated sales, the SPR Petroleum Account is the source of funding for the incremental costs of withdrawing oil from the storage caverns and transporting it to the point where purchasers take title. In CY 2022, the SPR Petroleum Account received $16,993,463,785 from emergency sales, or over $94 per barrel on average. Receipts from congressionally mandated sales go to the U.S. Treasury (except for receipts from crude oil sales conducted in accordance with Section 404 of the Bipartisan Budget Act of 2015, which go to the ESIM Fund as mandated by law).

The SPR Petroleum Account spent $33.2 million related to the cost of moving oil in CY 2022.

On April 15, 2014, the Secretary of Energy authorized establishment of the Northeast Regional Refined Petroleum Product Reserve, now identified as the NGSR, as a component of the SPR. The purpose of the NGSR is to mitigate market disruptions in the Mid-Atlantic and New England coastal areas. After establishment of a Congressional Control Level, the Office of Management and Budget apportioned $235.6 million in late June 2014 (receipts from an SPR test sale) to establish the NGSR.

For FY 2022, the capitalized cost of the crude oil in the SPR was $12.8 billion, with an average cost per barrel of approximately $30.68 (excluding storage costs) in accordance with Federal Accounting Standards. Inflated to 2022 dollars, the average cost per barrel is $79.84.

Through use of a Royalty-in-Kind (RIK) program, established by the Department of the Interior (DOI), from April 1999 through December 2009, the cumulative dollar value of the exchange barrels provided to the SPR by contractors who received royalty oil from DOI totaled $6.1 billion. The value of the RIK oil transferred from DOI to DOE through 2009, the last year of the program, is shown by FY in Table 10.

Table 10. Value of Royalty-in-Kind Transferred by the Department of the Interior

Fiscal Year	Royalty-in-Kind Transfer* Total Barrels (Source: DOE)	Reconciled Royalty-in-Kind Transfer Total Barrels* (Source: DOE)	Department of the Interior** Forgone Receipts ($000) (Source: DOI)
1999	11,928,981	8,135,603	***
2000	15,105,558	18,898,937	560,521
2001	1,568,220	1,568,220	61,654
2002	10,575,379	10,575,378	262,752
2003	34,742,046	34,852,185	1,044,350
2004	35,506,135	35,599,310	1,191,284
2005	25,185,527	25,184,519	1,194,618
2006	0	0	0
2007	8,742,829	4,425,911	306,191
2008	15,943,421	15,943,421	1,600,027
2009	4,493,099	6,798,713	268,537
Total	163,791,195	161,982,197	6,489,934

* In coordination with Minerals Management Service, DOE completed a total DOE-RIK program reconciliation (1999–2009) in CY 2009, requiring net figure adjustments to prior years.
** Net figures that include DOI preliminary volumes and adjustments to prior years.
*** DOI data not available.

Performance Measurement

In FY 2022, the SPR tracked five critical performance measures as part of the SPR Annual Operating Plan, in accordance with statutory requirements in the Government Performance and Results Act (GPRA) of 1993 and the GPRA Modernization Act of 2010. Table 11 reflects a complete accounting of the Office of Petroleum Reserves' performance measures.

Table 11. SPR Critical Performance Measures

Performance Measure	FY 2021 Actual Performance	FY 2022 Target Output	FY 2022 Actual Performance
Average Annual 90-Day Operational Drawdown Rate	4.18 MMB/Day	3.42 MMB/Day	4.06 MMB/Day
Calculated maintenance performance appraisal report rating	97.91	≥95 out of a possible 100 points	98.23
Operating cost per barrel of storage capacity	$0.27	≤$0.30 operating cost per barrel	$0.28
Multi-Year Oil Sales	0.4%	Annual drawdown costs < 1.5 % of revenue earned	0.24%
SPR Modernization Project	N/A*	≥ 0.85 on both Cost and Schedule Performance Index	CPI = 1.02 SPI = .94

* Not tracked and reported since the metric derives from the EVMS that has not been certified by the DOE Office of Project Management.

XI. Other Program Activities

Congressionally Mandated SPR Crude Oil Sales

In CY 2022, the SPR successfully carried out one congressionally mandated crude oil sale, the FY22 Winter Mandatory Sale. In February 2022, the SPR began crude oil sales in accordance with Section 30204 of the Bipartisan Budget Act of 2018 (Public Law 115-123) and Section 403 of the Bipartisan Budget Act of 2015 (Public Law 114-74) to meet the requirements for FY 2022. The sale successfully delivered 18,060,371 barrels over 76 shipments from January 1 through March 31.

From the FY 2022 Winter Mandatory Sale, the SPR deposited $1,752,623,260.05 of revenue into the General Fund of the Treasury.

Presidentially Declared Emergency Drawdown

On March 1, 2022, the IEA Governing Board agreed to a collective release of petroleum reserves in response to the escalation of the conflict in Ukraine and the tightening oil market. On March 1, 2022, President Biden issued a memorandum finding that a drawdown and sale of petroleum from the SPR is required by U.S. obligations under the International Energy Program implemented by the IEA. In his March 1, 2022, memorandum, President Biden authorized and directed the SPR to draw down and sell petroleum from the SPR at public sale to the highest qualified bidder for up to 30 million barrels, in accordance with section 161 of EPCA (Public Law 94-163), as amended, and the SPR competitive sales procedures in 10 CFR Part 625.

In accordance with section 161(d) of EPCA and President Biden's memorandum dated March 1, 2022, and finding, Secretary Jennifer Granholm directed the SPR to drawdown and sell 30 million barrels of petroleum from the Strategic Petroleum Reserve. Pursuant to section 167 of EPCA, the proceeds from these sales were deposited into the SPR Petroleum Account and titled Drawdown 1.

The SPR carried out its planned sale as provided for by the DOE Organization Act (42 U.S.C. 7101 et seq.) and Section 161(d) of EPCA (42 U.S.C. 6241) with a Notice of Sale (NOS) which was published on March 2, 2022. The Drawdown successfully delivered 30,146,344 barrels to 7 customers with 104 shipments concluding on May 31, 2022.

On March 31, 2022, the Biden Administration announced it would release an unprecedented 180 MMbbl in response to Russia's invasion of Ukraine. This directive was carried out via six subsequent NOS (Drawdowns 2A, 2B, 3A, 3B, 3C, and 3D) all in accordance with the DOE Organization Act (42 U.S.C. 7101 et seq.) and Section 161(d) of EPCA (42 U.S.C. 6241). Details on each of these drawdowns are listed below:

- From May 14 through July 1, 2022, the SPR carried out the first portion of the March 31, 2022, Presidentially Declared Emergency Drawdown (2A). The drawdown successfully delivered 29,921,168 barrels to 11 customers with 85 shipments.

- From June 27 through August 16, 2022, the SPR carried out the second portion of the March 31, 2022, Presidentially Declared Emergency Drawdown (2B). The drawdown successfully delivered 36,208,050 barrels to 9 customers with 101 shipments.

- From August 15 through October 1, 2022, the SPR carried out the third portion of the March 31, 2022, Presidentially Declared Emergency Drawdown (3A). The drawdown successfully delivered 38,782,946 barrels to 14 customers with 126 shipments.

- From September 16 through October 31, 2022, the SPR carried out the fourth portion of the March 31, 2022, Presidentially Declared Emergency Drawdown (3B). The drawdown successfully delivered 20,011,992 barrels to 9 customers with 63 shipments.

- From November 1 through November 30, 2022, the SPR carried out its fifth portion of the March 31, 2022, Presidentially Declared Emergency Drawdown (3C). The drawdown successfully delivered 10,149,723 barrels to 8 customers with 26 shipments.

- From December 1 through January 1, 2023, the SPR carried out its sixth portion of the March 31, 2022, Presidentially Declared Emergency Drawdown (3D). The drawdown successfully delivered 15,045,962 barrels to 6 customers with 42 shipments.

In summary, the SPR sold 180,266,185 barrels from March 2, 2022, through January 1, 2023, via 547 cargoes.

From the combined Presidential Drawdowns, the SPR deposited $15,858,014,080.71 of revenue into the SPR Petroleum Account with an additional $1,101,335,939.98 due from purchasers by

January 20, 2023, for December 2022 deliveries, and an additional $34,113,764.31 due from purchasers by February 20, 2023, for a total of $16,993,463,785.00.

In the Drawdown 2B and 3A cycles, the SPR removed all 15,708,698 of nonprivileged foreign (NPF) barrels from the Foreign Trade Zone (Big Hill) from July 2 through August 29, 2022. This was the first time in SPR history that removal of NPF occurred and was carried out with no exceptions. This was in large part due to the tremendous efforts of the multiple teams at the SPR along with critical U.S. Customs broker support. As of December 31, 2022, there are no NPF barrels remaining in the SPR.

Crude Oil Exchange

In response to Hurricane Ida the SPR commenced an emergency exchange in September 2021. The total barrels shipped in response was 3,296,825 barrels from September 10, 2021, through September 29, 2021. Due to the Presidentially declared emergency and subsequent drawdown of 180 MMbbl of crude oil, these barrels are now anticipated to be returned to the SPR in CY 2023 instead of the previously anticipated CY 2022.

The SPR initiated the FY 2022 Winter Exchange starting December 16, 2021. From December 10, 2021, through December 31, 2021, the SPR delivered 4,148,833 barrels over 17 shipments to its first two FY 2022 Winter Exchange partners. Additional barrels were made available through June of CY 2022. The Winter Exchange Program continued into CY 2022, from January 1 to June 28, 2022, the SPR delivered 20,219,493 barrels over 45 shipments to nine exchange partners. Over the course of the Winter Exchange Program the SPR delivered a total of 24,368,326 barrels to 9 different customers. Due to the scope of this program, the exchange barrels are anticipated to be returned in CY 2024 and 2025.

In response to the Keystone Pipeline leak near the end of CY 2022, the SPR commenced an Exchange for 1.8 MMbbl in December 2022. A total of 1.79 MMbbl over 4 cargoes were delivered in CY 2022. These barrels are anticipated to be returned starting in June 2024 and January 2025.

Government of Australia Storage and Subsequent Drawdown

In 2020, DOE and the GOA entered into a long-term agreement that allows the GOA to store crude oil at the SPR Big Hill site (located in a U.S. Free Trade Zone). Under this agreement, the GOA was able to purchase 1.5 MMbbls of sweet crude oil from one of the commercial firms storing oil at Big Hill as part of the Exchange for Storage program. A subsequent purchase of 195,000 barrels of crude in FY21 to be stored at Big Hill resulted in a 1,691,829 sweet barrel position for the GOA as of January 1, 2022.

On May 3, 2022, DOE converted the GOA entire position from 1,691,829 barrels (sweet) to 1,760,756 barrels (sour). On May 4, 2022, DOE received an oil release notification from the

GOA as part of GOA's release to meet its obligation under the IEA. This notification directed the SPR to sell the GOA's Big Hill crude oil to Shell (350,000 barrels) and Marathon (1,410,756 barrels) to comply with the IEA's collective release of petroleum reserves. The SPR delivered the prescribed volume from June 10 to June 27 over 5 shipments.

Northeast Gasoline Supply Reserve

The NGSR, a 1 MMbbl stock of gasoline, consists of contracted storage at multiple facilities in the New York Harbor area; the greater Boston, Massachusetts area; and the greater Portland, Maine area. Contracted storage became necessary because the SPR does not own storage facilities suitable for the storage of refined petroleum products. The Administration determined in 2014 that the benefits of contracting the storage of up to 1 MMbbl of refined petroleum products pursuant to the authority granted by Section 171 of EPCA are comparable to the benefits from a similar action undertaken under Title I, Part B of the statute. That Administration also determined the availability of funds in the SPR Petroleum Account would facilitate the creation of a refined petroleum product reserve in time for the 2014 hurricane season. Placing the refined petroleum product reserve within the normal supply chain also provides higher product quality, because unlike crude oil, refined petroleum products require periodic turnover for strict quality specifications.

The Northeast region of the U.S. heavily depends on product supplies from the Gulf Coast, as well as local refining and imports. Yet even though SPR crude oil stored along the Gulf Coast helps to mitigate the impacts of crude oil supply interruption(s), vulnerabilities elsewhere in the supply chain could still result in significant regional disruptions. Thus, the establishment of a regional product reserve closer to the point of consumption helps to mitigate the impact of short-term disruptions as stakeholders resolve issues with the larger supply chain (from crude oil refining through product distribution to consumers).

DOE provides operational oversight of the NGSR, which includes managing the contracts, providing independent product quality and quantity assurance certifications, performing annual audits, establishing a sales procedure and platform, and coordinating with each of the storage contractors for availability of and accessibility to the government-owned product.

The storage contractors are responsible for maintaining both the quantity and quality of the refined petroleum products, including any seasonal changeover of products to comply with the Environmental Protection Agency (EPA) Clean Air Act requirements. The contractors must also make available specific facilities in the event a release becomes necessary, including the ability to meet the government's release requirements in the aftermath of an event without commercial electric power. In addition, the contractors must provide detailed information on inventories, activities, and distribution capabilities at the request of DOE if conditions exist for a potential release.

As of the date of this report the NGSR has never been used for its intended purpose, namely, to supplement gasoline supplies to consumers affected by a supply disruption in the Northeast.

Currently the SPR PMO is executing a Firm Fixed Price contract with yearly options, which could carry the NGSR out until June 30, 2026.

The new NGSR contract distribution is as follows:

Buckeye Terminals LLC: South Portland, ME	99,000 bbl
Buckeye Terminals LLC: Port Reading, NJ	900,000 bbl

For FY 2021, the Administration proposed disestablishing the NGSR and proposed selling the product. With only 1 million barrels, the volume is less than 1 day of average gasoline consumption in the Northeast, so it would provide only minimal relief to a shortage condition. Yet it still costs approximately $16 million annually to maintain. However, Congress fully funded the NGSR for FY 2022, and the Administration did not propose disestablishing the NGSR in FY 2023.

Northeast Home Heating Oil Reserve (NEHHOR)

The NEHHOR, a 1 MMbbl stock of Ultra Low Sulfur Diesel (ULSD), consists of contracted storage at multiple facilities in the New York Harbor area; the greater Boston, Massachusetts area; and the Groton, Connecticut area. Contracted storage became necessary because the SPR does not own storage facilities suitable for the storage of refined petroleum products. The Administration determined in 2000 that the benefits of contracting the storage of up to 2 MMbbl of heating oil pursuant to the authority granted by Section 181 of EPCA provide an important safety cushion in the event of a severe heating oil disruption in the Northeast. That quantity was converted to ULSD and adjusted to 1 MMbbl in 2011. Placing the NEHHOR within the normal supply chain also provides higher product quality, because unlike crude oil, refined petroleum products require periodic turnover for strict quality specifications.

The Northeast region of the U.S. heavily depends on product supplies from the Gulf Coast, as well as local refining and imports. Yet even though SPR crude oil stored along the Gulf Coast helps to mitigate the impacts of crude oil supply interruption(s), vulnerabilities elsewhere in the supply chain could still result in significant regional disruptions. Thus, the establishment of the NEHHOR closer to the point of consumption helps to mitigate the impact of short-term disruptions as stakeholders resolve issues with the larger supply chain (from crude oil refining through product distribution to consumers).

DOE provides operational oversight of the NEHHOR, which includes managing the contracts, providing independent product quality and quantity assurance certifications, performing annual audits, establishing a sales procedure and platform, and coordinating with each of the storage contractors for availability of and accessibility to the government-owned product.

The storage contractors are responsible for maintaining both the quantity and quality of the ULSD. The contractors must also make available specific facilities in the event a release becomes necessary, including the ability to meet the government's release requirements in the

aftermath of an event without commercial electric power. In addition, the contractors must provide detailed information on inventories, activities, and distribution capabilities at the request of DOE if conditions exist for a potential release.

As of the date of this report the NEHHOR has never been used for its intended purpose, namely, to supplement heating oil supplies to consumers affected by a supply disruption in the Northeast. Currently the SPR PMO is executing a Firm Fixed Price contract with yearly options, which will carry the NEHHHOR out until March 31, 2024.

The new NEHHOR contract distribution is as follows:

Buckeye Terminals LLC: Port Reading, NJ	300,000 bbl
Buckeye Terminals LLC: Groton, CT	300,000 bbl
Global Partners LP: Revere, MA	50,000 bbl
Global Partners LP: Chelsea, MA	151,000 bbl
Gulf Oil LP: South Portland, ME	200,000 bbl

Quality and Performance Assurance

The SPR conducted oversight activities in accordance with DOE procedural requirements. These activities included on-site management appraisals, technical assessments, and quarterly reviews of the M&O contractor's Contractor Assurance System (CAS).

In accordance with DOE Order 226.1B, *Implementation of DOE Oversight,* the CAS requires the contractor to ensure work performance meets the applicable requirements for environment, safety, and health, including quality assurance and integrated safety management; safeguards and security; cyber security; business and financial systems; and emergency management. Additionally, an expansion of CAS at the SPR now covers Information Technology Services/Data Systems, Fire Protection, Legal, Project Management, Personnel/Human Resources/Human Capital, Internal Audit, Operations and Maintenance, Cavern Integrity, Procurement, Property, Engineering, Construction, and Capital Projects.

Personnel from the SPR's Quality and Performance Assurance Division (QPAD) completed three Technical Assurance Surveillance Reports in 2022. Oversight subject areas included documenting benchmarking of Performance Measurement employed throughout the DOE complex; oversight of CAS data validation exercises; and the performance of causal analysis associated with Internal Auditing non-conformances. QPAD led and participated in five Site Appraisals, utilizing both a remote and in-person format. These Site Appraisals assessed 98 topics representing multiple SPR program areas. Twenty-three non-conformances and 19 Opportunities for improvement were documented.

QPAD personnel also coordinated the oversight management process for the SPR. Six elements including the Project Manager, General Counsel, Management and Administration, Maintenance and Operations, Systems and Projects, and Technical Assurance developed annual

Oversight Management Plans for FY 2022. Each organization performed oversight activities in accordance with these plans and reported quarterly status to QPAD. Meanwhile, QPAD personnel conducted analysis and provided a roll-up status report to the Project Manager each quarter.

Oversight of the SPR's critical few performance measures included 14 objective processes and 10 LE2 measures. A subject matter expert assessed each measure to verify the M&O contractor's performance based on agreed-to objectives. QPAD then performed an independent assessment to validate the subject matter expert's due diligence. The Performance Fee Board then received both positive and negative results via a summary report from the board secretary. This information assisted the Project Manager, and the Performance Fee Board chairperson in determining appropriate fee distribution to the M&O contractor.

Additionally, QPAD led and participated in a multi-functional process improvement team that completed the task of enhancing the SPR's Performance Measurement System. After conducting a benchmarking exercise of other DOE sites, the Team recommended a set of proposals that were approved by managers and is currently being implemented on a multi-year timeline.

Vapor Pressure Mitigation

The SPR PMO recognized a need in 1992 for a continuous vapor pressure-mitigation program based on routine oil sampling of the caverns. Long-term storage of crude oil in salt caverns results in gradual geothermal heating that raises the temperature of the oil in caverns from approximately 80°F at the time of injection into the cavern, to a range between 110°F and 130°F over time. In addition, because of operational activities that include occasional injection of raw water into the cavern, gasses encapsulated in the salt release and absorb into the oil while stored. Naturally occurring methane gas may also migrate into the cavern through the salt matrix discontinuities. Under certain drawdown conditions, increased vapor pressure results in the release of gas into the atmosphere in amounts that may pose environmental, safety, and health risks.

The SPR's degas plant removes excess gasses from the crude oil SPR sells and distributes to customers with a greatly reduced potential for emission of volatile organic compound (VOC) ozone precursors, benzene, and hydrogen sulfide (H_2S). The degas plant reduces the VOCs in the vapors of treated oil by 97 percent. Specifically, given life-cycle VOC emissions from the plant averaging about 2 tons per year, emissions from a single full-scale drawdown of degassed oil would lead to a reduction of 77,000 tons of VOCs, or 1,900 times the pollutants generated from operation of the plant over the entire 25-year life cycle.

In 2022, it was decided that the new, modern unit being designed as part of the SPR Modernization Program's Life Extension Phase 2 Project would be deployed to Bryan Mound instead of Bayou Choctaw. However, due to lack of funding, the new degasification unit is no longer planned to be built. Instead, the SPR is evaluating other short-term alternatives to

reduce the need for degasification. One of these alternatives is the use of mechanical refrigeration Chillers.

The SPR is also working on a Major Maintenance task to install mechanical refrigeration Chillers at each SPR site to mitigate vapor pressure and increase the availability of caverns for sales and exchanges. Partial funding has been provided to complete the design, purchase, and installation of Chillers at Bayou Choctaw. Funding for other sites will be included in the Major Maintenance program for the FY 2025 through FY 2030 timeframe.

International Organization for Standardization (ISO) 14001

In May 2000, the SPR became the first bulk petroleum storage organization, public or private, to receive an ISO 14001, Environmental Management System (EMS) certification. The SPR was recertified to the ISO 14001:2015 Standard in 2021, which is valid through 2023.

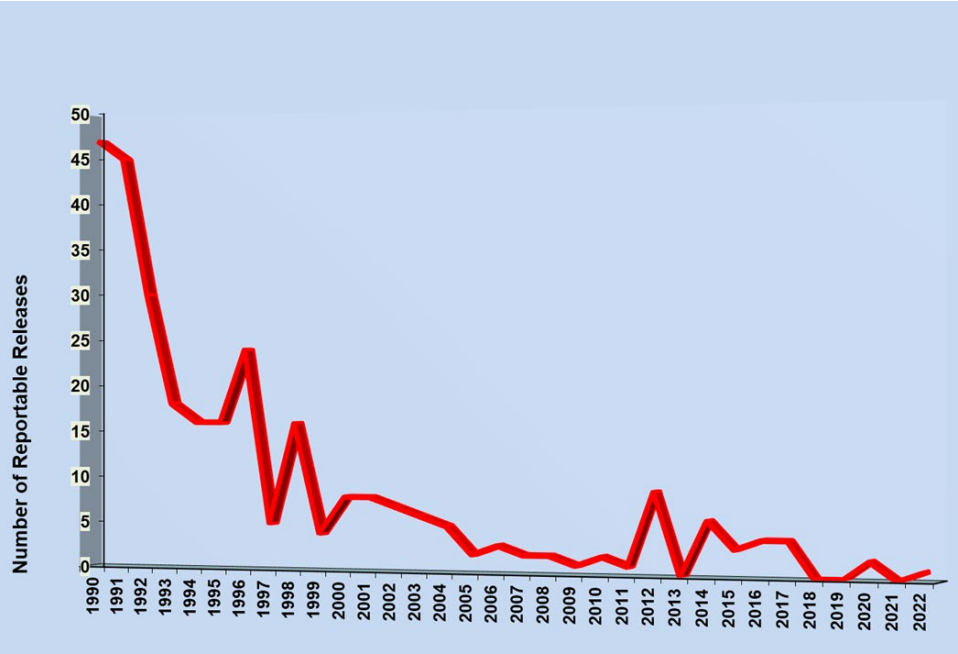
Environment, Safety, and Health

In CY 2022, the SPR had a TRC Rate of 0.15 and a DART Rate of 0.15.[6] These low rates of incidents involving injuries or illnesses, near the lowest of all time, positioned all four SPR storage sites to continue in OSHA's VPP. The VPP program is OSHA's official recognition that the employers and employees at a site have built an exemplary occupational safety and health system and maintain injury and illness rates below the averages for their respective industry. The Big Hill storage site received the "Star Award," for achieving incident rates at or below the national average. The Bayou Choctaw, West Hackberry, and Bryan Mound sites each received an additional VPP award, the "Star of Excellence," for achieving incident rates at least 90 percent below the national average.

Figure 6 shows the SPR's performance for reportable releases to the environment from 1993–2022. During CY 2022, there was one (1) reportable project events or reportable releases to the environment at the SPR.

[6] The TRC Rate is a metric used by OSHA to quantify the number of recordable occupational injuries and illnesses per 100 full-time employees. The DART Rate is a metric used by OSHA to quantify the number of days away from work, days of restricted work activity and days of job transfers caused by occupational injuries and illnesses per 100 full-time employees.

Figure 5. Environmental Reportable Releases 1990 – 2022



Pollution Prevention

The SPR sets fiscal year goals for non-hazardous solid waste and Construction and Demolition (C&D) waste generated at the sites. Waste diversion is the prevention and reduction of generated waste. The SPR achieves waste diversion in several ways, including source reduction, recycling, and/or reuse.

Hazardous Waste

While the SPR does not set a goal for diverting hazardous waste, the SPR strives to recycle all hazardous waste streams when possible. The SPR recycled 37 percent of the hazardous waste generated in CY 2022. The predominant contributing waste stream was brine and crude oil residuals that were reclaimed.

Non-Hazardous Waste

During CY 2022 the SPR maintained waste diversion efforts and achieved a waste diversion rate of 69 percent. Contributing waste streams included soil, used oil, paper, and miscellaneous solid wastes.

The SPR team continued efforts to reduce municipal solid waste by diverting 70 percent of non-hazardous solid waste during FY 2022. The goal was to divert at least 50 percent of non-hazardous solid waste. In FY 2022, the SPR team also continued the strategy to reduce municipal solid waste sent to landfills, which in turn helps achieve DOE greenhouse gas reduction targets.

Construction and Demolition Debris

The SPR generated 1.4 million pounds of C&D waste in CY 2022. Projects that generated a significant amount of C&D waste in CY 2022 include several LE2 projects that generated scrap metal and concrete.

The FY 2022 goal was to divert at least 50 percent of C&D waste generated through M&O projects and at least 50 percent of C&D waste generated through LE2 projects. The SPR M&O did not generate any C&D waste in FY 2022, as all C&D-related projects were conducted through LE2. The SPR achieved the LE2 C&D waste diversion goal by diverting 93 percent of all LE2-generated C&D waste (2.1 million pounds).

Exploration and Production (E&P)

Although there are no specific goals established for exploration and production (E&P) waste generation or diversion, the SPR continued with the effort to recycle this waste stream whenever possible. During CY 2022, the SPR diverted four percent of E&P waste. The generated E&P waste included brine and crude contaminated tank solids from the demolition of a 100,000-barrel brine tank at Bryan Mound during an LE2 project.

Environmental Improvement Measures

The SPR sites continued to maintain acreage for habitat enhancement of both native wildlife and resident and migratory birds. SPR personnel continued to coordinate U.S. Army Corp of Engineers' permit applications to ensure any proposed construction and maintenance activities in surrounding environmentally sensitive areas would have minimal negative impact.

Security and Emergency Operations

The SPR mitigated risk by ensuring the capability to effectively respond to any emergency during day-to-day operations and severe weather conditions. The Continuity of Operations Plan (COOP), Emergency Command Vehicle, communication vehicles, and Emergency Communications Network are the cornerstones for continuing essential work functions under catastrophic conditions. Protective Force personnel assist Emergency Response Team (ERT) members as "support responders" for emergency conditions. The SPR built the infrastructure for applying and maintaining a robust Homeland Security Presidential Directive 12-credentialing program that includes training and maintenance. During 2022, the SPR PMO modified its COOP response plan to address the manning shortage and workforce impact caused by the COVID-19 pandemic. The SPR PMO followed Center for Disease Control (CDC) and National and State Public Health institutional guidance, and guidance from Federal, state and SPR PMO Emergency Management and COOP subject matter experts and was able to successfully execute a pandemic response and continue primary and mission essential functions, operational readiness, and the continuation of daily maintenance and operational activities.

The SPR team continues to build upon its existing Memorandums of Understanding (MOU) and Memorandums of Agreement (MOA) to strengthen its relationships with local, state, and Federal law enforcement agencies, emergency response agencies, and personnel. The SPR program also conducts both security and emergency management exercises with these local agencies and personnel, and it supports local community events.

Safety and Health Improvement Areas

Safety and Health Maintains Best Practice Performance

The SPR continued to enhance safety and health systems throughout the complex during 2022. Various safety and health programs and procedures were maintained due to the COVID-19 pandemic. During 2022, the SPR continued the use of their managed care medical contractor by utilizing an off-the-shelf tool to perform health screenings and manage possible COVID-19 cases. Using this system and a robust COVID-19 communication process, the SPR managed 570+ potential COVID-19 cases during 2022 with zero work-related cases. The off-the-shelf screening tool expedites the daily health screening while notifying safety personnel of potential COVID-19 concerns.

The Management in Action program was established to allow management to engage in daily work evolutions at the sites. It encourages productive dialogue between managers and employees about relevant safety issues. In FY 2022, it led to more than 511 of these safety interactions, which improved communication and positively impacted workplace safety.

The SPR team also continued to strengthen involvement in the subcontracting selection process. The involvement in the subcontractor selection process is a proactive approach for reviewing performance of adequate risk assessments, and implementation of appropriate hazard controls. This has been and will continue to be particularly important and a key factor during the SPR's LE2 project. This level of oversight will continue through contract closeout with documented lessons learned.

During CY 2022, the SPR planned, prepared, and presented a virtual Health, Safety, and Environmental (HSE) Week in May 2022 with a focus on holistic safety and health, specifically focused on topics that included a focus on mental health support, vehicle safety, and cranes rigging and materials handling.

DOE and Occupational Safety & Health Administration's Voluntary Protection Program

The SPR participates in the OSHA VPP and the DOE VPP. Each SPR site must provide a self-evaluation to OSHA and DOE each year demonstrating continued improvement of the safety and health management system. The self-evaluation also includes 20 or more answers to specific questions about the in-place Process Safety Management System. Recommendations for improvements made during each of the OSHA on-site assessments must be replicated at all

sites. In 2022, all four sites maintained VPP certification. There were no on-site assessments in 2021 due to COVID restrictions.

Incident Rates for the SPR

The SPR continued to improve the safety and health systems throughout the complex during CY 2022. The SPR had another safe year in CY 2022. The SPR maintained record low injury and illness incident rates with a TRC Rate of 0.15 and a DART Rate of 0.15 for CY 2022. The SPR storage sites are recipients of several awards for management quality, environmental stewardship, and safety management systems.

Integrated Safety Management

The SPR completed an annual Integrated Safety Management (ISM) System validation and documentation of performance in the ISM System Annual Review and Update Report of 2022. This report summarized the results of all audits and assessments conducted during the FY and provided senior management with qualitative and quantitative data verifying that the ISM System performed effectively. In 2022, the SPR continued to make improvements to the ISM System Description and Annual Report such as the addition of new performance metrics and the inclusion of program information. The organization analyzed each ISM Core Function to identify possible areas for enhancement.

Annual Safety Summit and Tripartite Safety Council

The SPR team held the recurring annual Environment, Safety, and Health (ES&H) Summit in CY 2022. The ES&H Summit includes briefings by the safety, health, and environmental departments of the M&O contractor, as well as the security contractor. The ES&H Summit was held virtually due to COVID-19 and topics such as National Pollutant Discharge Elimination System (NPSES) Permits, industrial hygiene training, fire prevention, the Eastern Black Rail, the hazards of hydrogen sulfide, LE2 observation trends, and tropical storm event accountability were covered.

The SPR also cancelled the two Tripartite Safety Council meetings in CY 2022 due to COVID-19. The purpose of these council meetings is to give all SPR contractors' representatives an opportunity to address safety issues directly with the SPR Project Manager that have not yet been resolved through normal channels. Each SPR site, the security contractor, and the Architecture & Engineering (A&E) contractor have representatives at the meeting. Action items from these council meetings get tracked through closure. Although the in-person Tripartite Safety Council meetings were cancelled in CY 2022, numerous methods were established to address employee concerns including an anonymous Frequently Asked Question page and town halls. The vast majority of concerns expressed were related to COVID-19. The in-person Tripartite Safety Council Meetings are expected to resume in CY 2023.

In FY 2022, the M&O contractor continued the Health, Safety, and Environment Week that began in 2015, conducting virtual events available to all SPR employees at each of the SPR sites

during May. After a virtual kick-off by senior management from New Orleans, employees from all sites participated in daily activities highlighting holistic safety and health, specifically focused on topics that included mental health support, vehicle safety, and cranes, rigging, and materials handling.

The SPR information technology function is a leader in the execution and implementation of re-engineering business processes utilizing a combination of Microsoft SharePoint, SAP, and the Nintex workflow engine. The SPR team has developed and deployed more than 93 automated business processes that support timely and consistent task completion. Many new automated processes had to be built. The pandemic highlighted manual processes that relied upon face-to-face interaction. The following workflows were built to reduce the negative impact caused by being away from the office:

Table 12. SPR Process Workflow

Process Name	Workflow Description
Drawing Approval	This process allows DOE Project Engineers to review and accept drawing submissions electronically from prime architecture and engineering contractors.
Property Transfer	This workflow was built to review and approve government property transfers. The new electronic process replaces a paper process that was signed by four reviewers; the process enables DOE to remotely issue laptops while SPR employees work from home. The process assures that the backend inventory system is updated before the workflow finishes.
Building Access Request	This process is used to request access to SPR buildings during the pandemic. Since most workers are required to work from home, this process is used to request access to one of the SPR buildings.
Project Schedule Delivery	Tracks and provides DOE IT with requested Project Schedules related to IT Requests. Provides automated reminders and status updates to accelerate the speed in which IT projects can be completed.
Data Systems Support Monitor	Provides DOE insight on the progress of items sent for Enterprise Change Proposal evaluation and calculates deliverable dates to ensure projects do not fall behind.

Process Name	Workflow Description
Temporary Multi-factor Authentication Exception	Captures the reason, duration, and approval of any occasion where a temporary exception for PIV enforcement is warranted, then tasks the appropriate team to track the exception and ensure enforcement is properly restored.
Bayou Choctaw Inspection Sheets	Captures metrics used for standard site operations. The application provides the ability to centrally record and report on data in real time and alert if thresholds are exceeded allowing Site Personnel to have a preemptive view on any negative trends and ensure continued site operations.
Project Managers Document Approvals	Standardizes and speeds the review and approval process for documents routing to the Office of the Project Manager, providing the SPR with a central source for submittal of documents requiring the signature of the Project Manager.
Travel Request	SPR modified its travel request process to include workflow steps for Safety & Health review and Executive Management review to determine if travel is essential and proper protocols are in place.
IT Acquisition Requests	All non-exempt IT Acquisitions require approval from the DOE CIO. This workflow is used to develop and track the IT acquisition requests that are sent to DOE HQ for approval.
Distributed Control System (DCS) Remote Access	The DCS Remote Access workflow is used by authorized engineers to request remote access to DCS networks. The pandemic impacted direct in-person access to the SPR sites to work in the DCS environment, so a workflow was built to assure appropriate remote access controls were enabled and disabled as required. An approved workflow enables remote access to the DCS.
Vaccination Attestation	The M&O used this workflow to collect vaccination status for its employees in preparation for the vaccination mandate.
DocuSign Use Request	This workflow was created to assign electronic signature software to remote employees so that business documents could be electronically signed.

The other 80+ business processes that were previously automated continued to function during the pandemic. The ability to conduct online meetings was brought to the forefront of conducting business at the SPR. In support of ongoing pandemic response, training sessions

were held that demonstrated the capabilities of Microsoft Teams for online collaboration during maximum telework. The sessions showed users across the SPR how to use the tool's most common features. Since the start of the pandemic, all SPR meetings are held using one of the DOE approved web conferencing software tools.

Data Security, Accessibility, and Resiliency

The pandemic caused the SPR to support remote telework opportunities through a combination of cloud-based Virtual Private Network (VPN) Service (Zscaler) via government-furnished equipment (GFE) laptops, as well as Citrix access using GFE and non-GFE computers. Personal Identity Verification (PIV) card logon was utilized for GFE laptops on the Zscaler VPN, with SPR-issued Rivest-Shamir-Adleman (RSA) tokens for access via the SPR's Citrix Gateway. In addition, all DOE executive staff along with key contractor staff have GFE smartphones with access to email through the Microsoft cloud. In 2022, most of the SPR PMO staff continued maximum telework for ongoing pandemic response while continuing to execute the SPR mission.

In 2022, the SPR's Disaster Recovery (DR) environment was thoroughly tested due to the active hurricane season. The SPR's DR site is called the SPR Alternate Data Center (ADC). An ADC activation is usually performed by multiple IT technicians at the ADC facility near Dallas, Texas. However, the pandemic forced the SPR to activate the ADC remotely. A remote activation was successfully conducted for four different storms that posed a threat to SPR sites.

The SPR team implemented an enhanced cyber security program using innovative approaches, tailored controls, and monitoring of the SPR operational environment. The SPR has a Privileged Account Management solution that improves the security of privileged accounts on the SPR network by requiring usage of multifactor authentication via a PIV card. The SPR utilized the DOE-provided SynAck penetration testing service to evaluate the security of the SPR's internet-facing websites. Security improvements were recommended by the SynAck service, and these have been incorporated into the SPR websites for enhanced security.

Awards and Certifications

During 2022, SPR received the OSHA Region VI Star of Excellence Award for outstanding safety performance at the West Hackberry site, while the Bayou Choctaw, Big Hill, and Bryan Mound sites received Star awards.

The Stars Program awards agencies that have qualified as a VPP site. The Stars Program is a way to encourage continuous improvement among the VPP sites in Region VI by awarding different levels of Stars to those sites who have exceeded performance targets. The program has three levels: a facility with a single-year injury incident rate at least 50 percent below the industry average is a "star among stars;" a site that is 75 percent below the national average is a "super-star among stars;" and the highest level, a facility that is 90 percent below the national average is a "star of excellence" winner.

International Organization for Standardization 9001 Quality Management System

During 2022, FFPO maintained ISO 9001 and 14001 certifications and updated their Environmental Management System to comply with the newer ISO 14001:2015 standard.

Customer Service

The SPR's Customer Service Team typically meets with several refiners, traders, pipeline companies, and other customers during the American Fuel and Petrochemical Manufacturers annual meeting. Despite the lack of in-person meetings, frequent phone conversations, emails and text messages allowed the team members to stay in frequent contact with customers. Meetings with customers always have two primary functions: to gather customer information to improve the SPR's response capabilities and to update those customers on SPR activities. The customers provided valuable feedback and reported that the overall experience was excellent.

To maintain an accurate and current list of customer contacts, the SPR seeks to validate customer contact information and obtain updates on refinery activities, such as expansion plans and any planned or actual changes to crude oil inputs. Customers also provide operational or administrative issues encountered when dealing with the SPR.

The Customer Service Team provided updates to SPR customers regarding the status of the SPR and welcomed questions. Customers provided the team with updates on refinery closings, shutdowns, and hurricane upgrades.

Real Estate Actions

During 2022:

- The SPR's Office of Asset Management teamed with the FFPO Property Section to conduct Facilities Information Management System mock and actual validations for buildings, trailers, and other structures and facilities; DOE-owned land; DOE-archived assets; and DOE leases.
- SPR executed the second of two five-year options to amend the Stennis Warehouse Use Agreement for an additional five-year period which will now expire June 30, 2026.
- Acquired the Painters Shed, North Maintenance Area, and South Maintenance Area buildings to replace those damaged from Hurricanes Laura and Delta at the West Hackberry Site located in Cameron Parish, Louisiana.
- The Bus Transit Shelter near the SW Gate was excessed at Bryan Mound located in Brazoria County, Texas.

- The following properties were excessed and are undergoing disposition at the West Hackberry Site located in Cameron Parish, Louisiana: the North and South Maintenance Shed, Painter's Shed, and Guard House buildings along with the Analyzer, Firewater, and Flammable Storage trailers.

XII. Conclusion

DOE Office of Petroleum Reserves and the SPR PMO continue to operate and maintain the SPR's emergency stockpile of crude oil in accordance with EPCA (42 U.S.C. § 6201, et seq.) to meet its primary mission of protecting the U.S. economy from the effects of a severe energy supply interruption and consequences of interruptions in supplies of petroleum products as evidenced by the historically large emergency sales in CY 2022. As a result, the SPR entered CY 2022 with 593.7 MMbbl of crude oil and ended with 372.1 MMbbl.

With a dedicated Federal civilian workforce and an equally dedicated M&O contractor workforce, the SPR program is well positioned to continue the unique status as a protector of the U.S. economy, and in partnership with the IEA to act as a deterrent to rogue actors across the globe who seek to destabilize world oil markets.

Appendix: Strategic Petroleum Reserve Site Information

Bryan Mound

Location

Brazoria County, Texas (3 miles southwest of Freeport, Texas).

Site Description

Authorized 247 MMbbl storage facility with 19 active caverns.

24-inch diameter, 6-mile brine disposal pipeline extending four 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. Twenty-one (21) pumps totaling approximately 45,000 horsepower.

System Parameters

Design Drawdown Rate:	(Sour)	1,500,000 bbl/d
	(Sweet)	1,000,000 bbl/d
Raw Water Pumping Rate:		1,626,000 bbl/d
Oil Fill Rate:		225,000 bbl/d
Brine Disposal Rate:		240,000 bbl/d

Distribution Facilities

DOE-owned 3.9-mile, 30-inch pipeline to Seaway Freeport Marine Terminal; DOE-owned four-mile, 30-inch pipeline to Seaway Jones Creek Tank Farm; and Pipeline and DOE-owned 46.3-mile, 40-inch pipeline to Genesis Texas City Terminal, and Seaway Texas City Terminal and Docks.

Acquisition

Acquired 499.47 acres fee simple, through eminent domain, in April 1977, from Freeport Mineral Company and other owners. Dow Chemical Company was the previous operator.

West Hackberry

Location

Cameron Parish, Louisiana (25 miles southwest of Lake Charles, Louisiana).

Site Description

Authorized 220 MMbbl storage facility with 21 active caverns.

Oil, brine, and raw water piping distribution system connecting caverns with central plant, water intake structure located on Intra-coastal waterway and nine brine disposal wells. Thirty-three (33) pumps totaling over 41,680 horsepower.

System Parameters

Design Drawdown Rate:	(Sour)	1,300,000 bbl/d
	(Sweet)	1,180,000 bbl/d*
Raw Water Pumping Rate:		1,400,000 bbl/d
Oil Fill Rate:		225,000 bbl/d
Brine Disposal Rate:		112,000 bbl/d**

* WH Sweet DD Rate currently reduced to 1,180,000 bbl/d due to Cavern WH-105 conversion to Sour service (Deviation WH-D3-136 applies).

** WH Oil Fill Rate currently reduced to 112,000 bbl/d due to brine disposal well issues.

Distribution Facilities

DOE-owned 42.8-mile, 42-inch pipeline to Sunoco Nederland Terminal; DOE-owned 13.6-mile, 36-inch pipeline to Zydeco Pipeline common carrier pipeline system (Lake Charles Meter Station) at Carlyss.

Acquisition

Acquired 405.36 acres' fee simple through eminent domain, in 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, first in July 1979 and then in March 1980.

Big Hill

Location

Jefferson County, Texas (26 miles southwest of Beaumont, Texas).

Site Description

Authorized 170 MMbbl storage facility with 14 active caverns.

Oil, brine, and raw water systems connecting caverns with central plant, water intake structure located on the Intracoastal Waterway, and a 48-inch diameter, 14-mile brine disposal pipeline

extending four miles offshore in the Gulf of Mexico. Forty-eight (48) pumps totaling 46,000 horsepower.

System Parameters

Design Drawdown Rate:	(Sour)	1,100,000 bbl/d
	(Sweet)	1,000,000 bbl/d
Raw Water Pumping Rate:		1,192,000 bbl/d
Oil Fill Rate:		225,000 bbl/d
Brine Disposal Rate:		240,000 bbl/d

Distribution Facilities

DOE-owned 24.5-mile, 36-inch pipeline to Sunoco Nederland Terminal; Phillips 66, 2-mile, 24-inch pipeline to Phillips 66 Beaumont Terminal Docks; Zydeco Pipeline common carrier pipeline system to Houma, Louisiana.

Acquisition

Acquired 271 acres fee simple, through eminent domain, in November 1982 and July 1983, from three landowners (238.48 acres from Amoco, 27.06 acres from the Pipkin estate, and 5.46 acres from the Patrick Henry Phelan estate).

Bayou Choctaw

Location

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

Site Description

Authorized 76 MMbbl storage facility with six active caverns.

Oil, brine, and raw water piping distribution system connecting caverns with central plant, a water intake structure, and 12 brine disposal wells). Eighteen (18) pumps totaling over 18,000 horsepower.

System Parameters

Design Drawdown Rate:	(Sour)	515,000 bbl/d
	(Sweet)	300,000 bbl/d
Raw Water Pumping Rate:		558,000 bbl/d
Oil Fill Rate:		110,000 bbl/d
Brine Disposal Rate:		104,000 bbl/d

Distribution Facilities

DOE owned 37.2-mile, 36-inch pipeline to Shell's Sugarland Terminal. Placid owned 16-mile, 24-inch Bourre pipeline to Baton Rouge.

Acquisition

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

In 1985, DOE 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.

In November 2011, DOE acquired an existing cavern through eminent domain from A. Wilbert's L.L.C. to replace Cavern 20, which has experienced preferential leaching and is within 60 feet of the edge of the dome, posing an environmental risk with continued use.

Appendix A. List of Acronyms

A&E	Architectural and Engineering
ADC	Alternate Data Center
ASFE	Assistant Secretary for Fossil Energy
BBL	Barrel
BBL/D	Barrels Per Day
BPH	Barrels Per Hour
COVID-19	Coronavirus Disease 2019
CAS	Contractor Assurance System
C&D	Construction and Demolition
CY	Calendar Year
DART	Days Away/Restricted/Transferred
DAS	Deputy Assistant Secretary
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DR	Disaster Recovery
E&P	Exploration and Production
EAC	Environmental Advisory Committee
EFS	Exchange for Storage
EIR	External Independent Review
EPEAT	Electronic Product Environmental Assessment Tool
ERT	Emergency Response Team
EPA	Environmental Protection Agency
EPCA	Energy Policy and Conservation Act
EMPCO	ExxonMobil Pipeline Company
ES&H	Environment, Safety, and Health
ESIM	Energy Security and Infrastructure Modernization
FFPO	Fluor Federal Petroleum Operations
FY	Fiscal Year
GFE	Government-Furnished Equipment
GOA	Government of Australia
H2S	Hydrogen Sulfide
IEA	International Energy Agency
IEP	International Energy Program
ISM	Integrated Safety Management

ISO	International Organization for Standardization
JHA	Job Hazard Analysis
LED	Light-Emitting Diode
LE2	Life Extension Phase 2
MBBL	Thousand Barrels
MBBL/D	Thousand Barrels Per Day
MMBBL	Million Barrels
MMBBL/D	Million Barrels Per Day
M&O	Management and Operations
NGSR	Northeast Gasoline Supply Reserve
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
PO	Program Office
QPAD	Quality and Performance Assurance Division
RECAP	Readiness and Capability
RIK	Royalty-In-Kind
RSA	Rivest-Shamir-Adleman
SPR	Strategic Petroleum Reserve
SPREX-RECAP	SPR Exchange Readiness and Capability
SPR PMO	Strategic Petroleum Reserve Project Management Office
TRC	Total Recordable Case Rate
VOC	Volatile Organic Compound
VPN	Virtual Private Network
VPP	Voluntary Protection Program

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