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The Strategic Petroleum Reserve: Background, Authorities, and Considerations

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SUMMARY

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The Strategic Petroleum Reserve: Background, Authorities, and Considerations

Crude oil price volatility has consequences for the U.S. and global economy. The Strategic Petroleum Reserve (SPR), the U.S. stockpile of petroleum, has played a role in U.S. energy policy for over 40 years. The need for a stockpile of petroleum to help protect against supply disruptions became apparent after the 1973-1974 Arab oil embargo, during which time the average price of imported crude oil tripled.

The oil embargo also fostered the establishment of the International Energy Agency (IEA), an intergovernmental organization, and the development of coordinated plans and measures among IEA members for emergency responses to energy crises. Strategic petroleum stock holdings are one policy included in the agency's International Energy Program (IEP) agreement. As an IEA member and IEP signatory, the United States must meet certain stock holding thresholds and be prepared for a coordinated response during an emergency. In 1975, Congress passed the Energy Policy and Conservation Act (EPCA, P.L. 94-163) authorizing the creation of the SPR for storage of petroleum products to reduce the impact of supply disruptions and to carry out IEP obligations.

The United States uses the SPR to meet its IEP requirements. The U.S. federal government, through the U.S. Department of Energy (DOE), manages the SPR. EPCA authorizes the SPR to hold stocks of crude oil or any refined petroleum product. However, the SPR currently only holds crude oil.

Since 1975, Congress has enacted several laws that have expanded the role of the SPR. Through 2019, the SPR has released over 230 million barrels of crude oil for various authorized purposes. Presidents have ordered releases on three occasions in response to severe energy supply interruptions in coordination with other IEA member countries. Other sales authorized for various reasons (e.g., to generate revenue to reduce the budget deficit as well as to modernize the SPR) have reached around 88 million barrels through 2019. Three test sales have confirmed SPR operability. The Secretary of Energy has several authorized methods to acquire petroleum for the SPR: direct purchases, royalty-in-kind transfers (RIK), deferrals and exchanges, or other means.

Government analysis indicates that the United States has been a net exporter of crude oil and petroleum products from September 2019 through January 2020. The IEP does not require net exporters to maintain a petroleum stockpile. IEA members can use both public and commercial stocks to meet their obligation. Both public and privately held oil stocks have important roles to play in providing security in times of oil market disruptions. Similarly, both public and private oil stocks have some role in oil price determination and movements. However, there may be benefits to maintaining SPR oil stockpiles, as the oil market can often be unpredictable, as demonstrated by dramatic demand/supply shifts and subsequent low oil prices experienced in early 2020. Several signs have suggested oil markets may be more able to adjust to supply disruptions (though not necessarily an oversupply).

The changing role of the United States in world petroleum markets has driven a debate on how best to utilize the SPR. Congress's motivation in creating the SPR focused on a deliberate and dramatic physical supply disruption and on mitigating the economic effects of a shortage stemming from international events. As market conditions continue to evolve, and the United States experiences new market conditions, Congress may consider options for utilizing the SPR in an oversupplied, low oil price environment.

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Introduction

The Strategic Petroleum Reserve (SPR), the world's largest supply of emergency crude oil, has played a role in U.S. energy policy for over 40 years.[1] The SPR's focus has evolved as conditions in the U.S. and world oil markets have changed. As created, the SPR's purpose was to "diminish the vulnerability of the United States to the effects of a severe energy supply interruption, and provide limited protection from the short-term consequences of interruptions in supplies of petroleum products."[2] Additionally, as a signatory to the International Energy Program (IEP) agreement, the United States is obligated to maintain strategic petroleum stock holdings in preparation for a coordinated response during an emergency. Due to changes to the oil market over the past several years, the role of the SPR may be of congressional interest.

From the mid-1970s through the present day, the United States has absorbed a number of significant spikes in the price of crude oil and petroleum products from supply disruptions.[3] Whether driven by disruptions in the physical supply of petroleum,[4] unexpected demand growth, or by uncertainties owing to international conflicts and instabilities, oil price volatility has had consequences for the U.S. economy. The price of crude oil historically rises or falls with the world economy. However, supply generally does not smoothly follow demand, and numerous factors can impact crude oil prices (e.g., supply, demand, available supply, value of the dollar, geopolitical risks). Thus, oil prices can be volatile. Volatility in crude oil prices can disrupt or enable oil industry investments and production—factors that can have a ripple effect on the global economy. The oil market also responds to geopolitical events. Crude oil and petroleum products are globally traded commodities and as such, global price fluctuations affect U.S. prices and the economy.

Several signs suggest an oil market that may be better equipped to respond to supply disruptions: a trend in lower crude oil prices beginning in 2014, the role of Organization of the Petroleum Exporting Countries (OPEC), new U.S. capacity in the market, and evolving consumption patterns. Technological advancements employed in the United States have added significantly to U.S. crude oil production.[5] In December 2015, Congress lifted restrictions on U.S. crude oil

[1] U.S. Department of Energy, "About the SPR," at https://www.energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve.

[2] P.L. 94-163 Section 151(a).

[3] Some of these disruptions have included the Arab oil embargo (1973-1974), the deposing of the Shah of Iran, followed by the Iranian revolution (1979-1980), the Persian Gulf War (1990), and periodic production cuts by the Organization of the Petroleum Exporting Countries (OPEC), as well as rapid growth in world oil demand. Starting in 2003, with the U.S. invasion of Iraq, petroleum prices again began rising, leading to the peak prices that were reached in the summer of 2008. Natural events and accidents have also affected petroleum production and prices. Natural events, including Hurricanes Rita, Katrina, and Gustav, disrupted crude oil production in the Gulf of Mexico Outer Continental Shelf (OCS). The 2010 BP Macondo oil well blowout that resulted in a moratorium on OCS drilling permits also affected petroleum production and prices. More recently, attacks on oil infrastructure in Saudi Arabia in 2019 temporarily affected petroleum production and prices, perhaps indicating that the market mechanisms have developed to adequately handle such an interruption in supply. For more information, see CRS Insight IN11167, *Attacks Against Saudi Oil Rattle Markets*, by Michael Ratner, Christopher M. Blanchard, and Heather L. Greenley.

[4] Petroleum includes both crude oil and petroleum products. Crude oil is both a raw ingredient for transportation fuels and a petrochemical feedstock to produce heating oil, lubricants, and other products. Refineries process crude oil to produce petroleum products (e.g., gasoline). For more on these terms, see U.S. Energy Information Administration, "Frequently Asked Questions," online database, at https://www.eia.gov/tools/faqs/faq.php?id=40&t=6.

[5] Hydraulic fracturing and horizontal drilling technologies largely enabled the production growth of the past decade. Hydraulic fracturing allows crude oil trapped inside "tight" rock formations to be released. Fluid forced under high pressure into the formation fractures it, creating fissures through which the oil can flow. Horizontal drilling requires a single vertical wellbore at the surface and then drills out horizontally underground across numerous points of

exports.[6] The United States is exporting crude oil at record levels, causing U.S. crude oil and petroleum product net imports to decline. According to U.S. Energy Information Administration (EIA) data, the United States was a net exporter of crude oil and petroleum products from September 2019 through January 2020, the most recent data.[7]

However, oil markets remain volatile. An oversupplied oil market, as experienced in early 2020, can contribute to lower crude oil prices. While low crude oil prices can often mean lower gasoline prices for consumers, it also can create economic challenges for oil producers and others along the supply chain, some of which may lead to long-term impacts. During a time of oversupply and low prices, some policymakers have discussed the possibility of having the Department of Energy (DOE) purchase crude oil to increase oil stockpiles in the SPR. However, such a purchase would require appropriations from Congress.

Background

The creation of the SPR came about because of events during the 1973 Arab-Israeli War. The Organization of Arab Petroleum Exporting Countries (OAPEC) reduced crude oil production and imposed an embargo on the United States and other countries supporting Israel.[8] While some Arab crude oil did reach the United States, the average actual nominal price of imported crude oil tripled from 1973 to 1974.[9]

Petroleum, a globally traded commodity, is subject to international demand and supply conditions; in the absence of additional regulations, a petroleum-consuming nation pays the market price for petroleum, even in a supply emergency. However, the availability of strategic stocks can help mitigate the magnitude of the market's reaction to a crisis or guarantee supply to certain consumers (e.g., the military, strategic industries). Congress's motivation in creating the SPR focused on a deliberate and dramatic physical supply disruption and on mitigating the economic effects of a shortage stemming from international events. In the event of a supply interruption, proponents reasoned that introducing petroleum into the U.S. market from the SPR could offset the lost supply and in doing so help calm markets, mitigate sharp price spikes, and reduce economic disruptions. Congress did not necessarily design the SPR to provide price support in the event of an oversupplied market. However, 42 U.S.C. §6240 does authorize the Secretary of Energy to acquire crude oil for the SPR with the objective of minimizing costs, so long as there are appropriated funds to do so.

extraction. For more information, see CRS Report R45493, *The World Oil Market and U.S. Policy: Background and Select Issues for Congress*, by Heather L. Greenley.

[6] P.L. 114-113. For more information on considerations leading to this decision, see CRS Report R43442, *U.S. Crude Oil Export Policy: Background and Considerations*, by Phillip Brown et al.

[7] Latest data available, see U.S. Energy Information Administration, "U.S. Net Imports of Crude Oil and Petroleum Products," online database, available at https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MTTNTUS2&f=M.

[8] U.S. Department of State, Office of the Historian, "Oil Embargo 1973-1974," available at https://history.state.gov/milestones/1969-1976/oil-embargo.

[9] For prices, see U.S. Energy Information Administration, "Real Prices Viewer," at https://www.eia.gov/outlooks/steo/realprices/.

International Energy Agency

The OAPEC embargo fostered the establishment of the International Energy Agency (IEA). The IEA develops coordinated plans and measures among member countries for emergency responses to energy crises. Strategic reserves are one of the policies included in the agency's International Energy Program (IEP) agreement. Signatories to the agreement, including the United States, are committed to maintain petroleum stocks equivalent to 90 days of their prior year's net imports,[10] developing programs for demand restraint in the event of emergencies, and agreeing to participate in allocation of oil deliveries to balance a shortage among IEA members.[11] Net-exporting members do not have a stock-holding obligation. These measures of days of protection assume a total curtailment of oil supply to importing nations, a scenario that is highly unlikely.

IEA member countries can meet the 90-day obligation through a combination of stock holdings by industry, a separate agency, and the government. Numerous oil industry firms hold commercial stocks of crude oil at refineries, bulk terminals, and in pipelines. The purpose of these stocks is to ensure the continuous operation of the refining industry, which transforms crude oil into petroleum products used by consumers. In the United States, commercial stocks do not necessarily provide a level of security proportional to that of the SPR, as they are inherently market driven, not government operated. Companies may have an economic rationale to lower commercial stocks in spite of a security context. In some other countries, this may not necessarily be the case, as the government may own or be the major shareholder in the oil companies (e.g., Equinor in Norway), also known as national oil companies (NOCs). NOCs operate under government ownership or are under the influence of national governments.

Energy Policy and Conservation Act

In response to the embargo, and to fulfill IEP obligations, Congress authorized the creation of an SPR in 1975 under the Energy Policy and Conservation Act (EPCA, P.L. 94-163). In 1975, U.S. crude oil production averaged at 8.3 million barrels per day, while U.S. consumption of petroleum was nearly double, at 16.3 million barrels per day.[12] The EPCA originally established the SPR to hold up to 1 billion barrels of "petroleum products," defined in 42 U.S.C. §6202(3) as "crude oil, residual fuel oil, or any refined petroleum product (including any natural liquid and any natural gas liquid product)." Congress intended the SPR to help prevent or mitigate a repetition of the economic disruption that the 1973 Arab embargo had caused.[13]

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[10] "The IEA minimum stockholding obligation is based on the average daily net imports of the previous calendar year. This covers all petroleum, including both primary products (such as crude oil and natural gas liquids [NGLs]) and refined products, with the exception of naphtha and volumes of oil used for international marine bunkers. Refined products are converted to crude oil equivalent, the amount of crude necessary to produce a given amount of product." For more on IEA methodology, see International Energy Agency, "Methodology," at https://www.iea.org/articles/oil-stocks-of-iea-countries.

[11] IEA member countries are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Republic of Korea, Luxembourg, Mexico, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, The Netherlands, Turkey, the United Kingdom, and the United States. See https://www.iea.org/about/membership.

[12] U.S. Energy Information Administration, Petroleum and Other Liquids, online database, available at https://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbblpd_a.htm and https://www.eia.gov/dnav/pet/pet_cons_psup_dc_nus_mbbl_m.htm. EIA uses the term *product supplied* to approximate consumption, as it measures the disappearance of these products from primary sources.

[13] Congress established the SPR in Part B of Title I of the Energy Policy and Conservation Act, P.L. 94-163.

The U.S. federal government, through the U.S. Department of Energy (DOE), manages the SPR. According to IEA data for January 2020, the SPR held emergency petroleum stocks equivalent to approximately 274 days of the previous year's net imports and U.S. industry had 423 days' worth of commercial stocks, for a total of around 697 days of net imports when combined, well above the IEA obligation.[14]

SPR Specifications

The SPR's current capacity is physically limited to 713.5 million barrels, with current inventory at about 635 million barrels.[15] In 1975, EPCA required that the SPR provide enough storage for at least 150 million barrels of petroleum and up to 1 billion barrels. In 1978, Congress authorized an expansion of the SPR's physical capacity to 750 million barrels, and in 2005 directed further expansion to the authorized 1 billion barrels.[16] Advocates for expansion argued that the SPR would need to be larger for the United States to be able to maintain stocks equivalent to 90 days of net imports. At this time the United States was viewed as a growing importer of crude oil. In 2005, DOE evaluated several sites in the Gulf Coast as a possible location for an additional 160 million barrels of new capacity.[17] However, oil produced using hydraulic fracturing and horizontal drilling techniques started coming to market in significant amounts in 2010. In FY2011, the Obama Administration cancelled SPR expansion plans, citing a U.S. Energy Information Administration (EIA) projection that, "U.S. petroleum consumption and dependence on imports will decline in the future and the current Reserve's projection will gradually increase to 90 days by 2025."[18]

Petroleum Storage

EPCA authorizes use of the SPR to hold stocks of crude oil or any refined petroleum product. However, the SPR only holds crude oil. It does not hold refined petroleum products, as some other countries' reserves do. According to DOE, this decision was based on findings from an analysis conducted in preparation for the 1977 SPR Plan. The findings suggested that then, as now, the United States had sufficient domestic refining capacity to meet domestic demand. The SPR could also buy time for the crisis to resolve or for diplomacy to seek some resolution before a potentially severe oil shortage escalated the crisis. Additionally, according to DOE, petroleum products are less flexible and degrade more quickly as compared to crude oil. Further, U.S. import dependency recently has largely been on crude oil, not petroleum products—the United States has been a net exporter of petroleum products since late 2010. As a result, potential supply disruptions would most likely affect the United States through the disruption of crude oil, and not necessarily petroleum products.

[14] The same volume of SPR oil can corresponded to a wide range of days of reserve, as the days are measured by the previous year's net imports.

[15] Department of Energy, "Strategic Petroleum Reserve Inventory," February 7, 2020, at https://www.spr.doe.gov/dir/dir.html.

[16] The Energy Policy Act of 2005, P.L. 109-58, Section 301, Permanent Authority to Operate the Strategic Petroleum Reserve and Other Energy Programs.

[17] Department of Energy, "Environmental Impact Statement: Site Selection for the Expansion of the Strategic Petroleum Reserve," 70 *Federal Register* 52088, September 1, 2005.

[18] Department of Energy, "Cancellation of Supplemental Environmental Impact Statement for Ancillary Facilities for the Richton Site of the Strategic Petroleum Reserve," 76 *Federal Register* 55890, September 9, 2011.

Generally, two key characteristics, density (i.e., specific gravity) and sulfur content, are the metrics used to classify crude oil types. The density is measured using API gravity, a scale developed by the American Petroleum Institute, that expresses the "lightness" or "heaviness" of crude oils on an inverted scale (i.e., the lower the API gravity, the heavier or denser the crude oil). The SPR does not contain heavy crude oil (i.e., crude oil with an API gravity below 22.3 degrees).[19]

Sulfur content of crude oil is generally rated on a scale of "sweet" to "sour"—sour crude oils have a higher sulfur content compared to sweet crude oils. The SPR contains both sweet and sour crude oils. Should the prospect of releasing SPR oil arise, the relevant question may be whether to release sweet or sour crude oil to the market. For example, in 2011, President Obama ordered a sale of 30 million barrels of light sweet crude oil to offset a curtailment in Libya's production of a similar crude during the First Libyan Civil War. In other situations, it may be more strategic to release heavier crude, as most U.S. Gulf Coast refineries are optimized to process heavy crude.

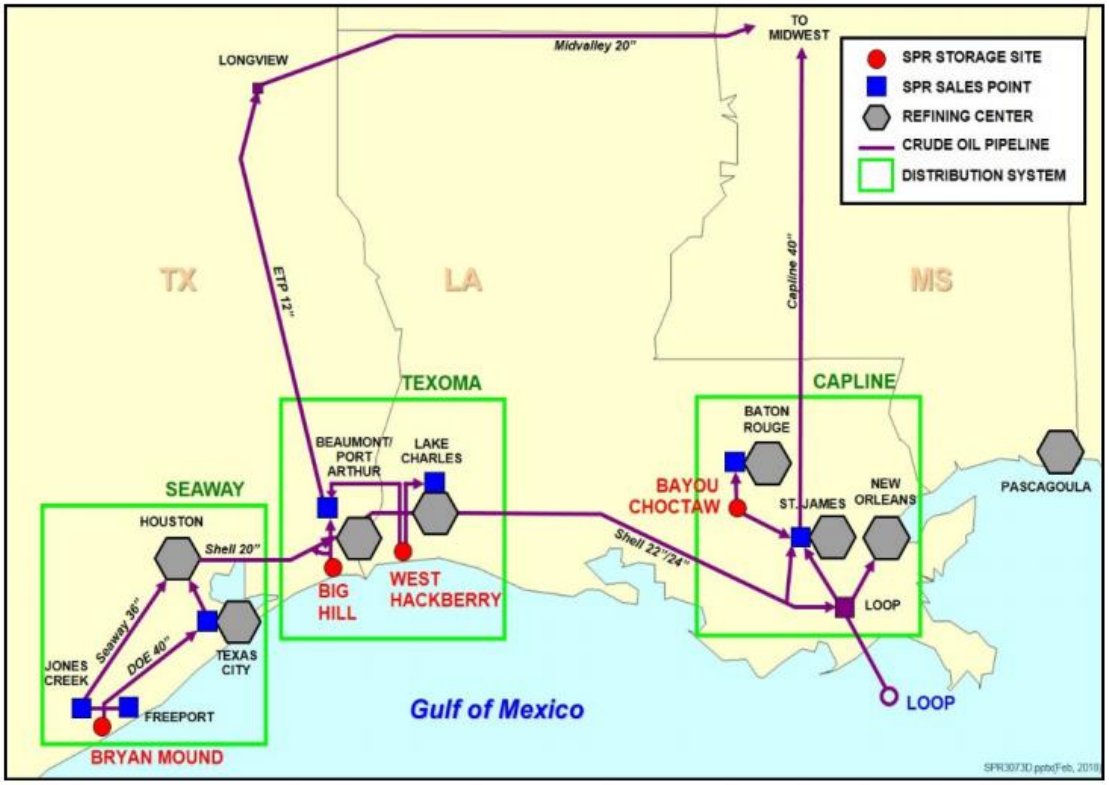
SPR Sites

The SPR physically comprises four sites, two in Texas and two in Louisiana. The sites offer access to both marine terminals and pipeline systems needed for moving crude oil to and from the SPR (**Figure 1**). Crude oil at each site is stored in salt caverns created within naturally occurring geologic salt deposits along the coast.[20] According to DOE, these sites provide a higher level of security and affordability, compared to other options such as above-ground tanks or rock mines.

[19] U.S. Department of Energy, *Long-Term Strategic Review of the U.S. Strategic Petroleum Reserve*, Report to Congress, August 2016, p. 12.

[20] Department of Energy, "SPR Storage Sites," available at https://www.energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve/spr-storage-sites.

Figure 1. SPR Storage Site and Distribution System



Source: U.S. Department of Energy, *Strategic Petroleum Reserve Annual Report for Calendar Year 2018*, Report to Congress, January 2020, p. 13.

A life extension program (LEP I), initiated in 1993, cost $324 million and addressed essential improvements to ensure drawdown capability across the four sites. While LEP I did address its objective of assuring maximum rate for drawdown capability, it did not address significant equipment needs across the systems.[21] In 2015, a second life extension program (LEP II) began upgrading equipment at the four SPR sites.[22]

Drawdown Capacity

The SPR has a maximum drawdown rate of roughly 4.4 million barrels per day for 90 days (396 million barrels over the 90-day period) due to capacity constraints in the pipelines and marine terminals servicing the reserve.[23] After 90 days, the rate would begin to decline as the caverns deplete.[24] According to DOE, the crude oil takes about 13 days from a presidential decision to enter the market, due to processing sales and preparation for distribution assets. The first major

[21] U.S. Department of Energy, *Long-Term Strategic Review of the U.S. Strategic Petroleum Reserve*, Report to Congress, August 2016, p. 36.

[22] For additional details, see U.S. Department of Energy, *Strategic Petroleum Reserve Annual Report for Calendar Year 2018*, Report to Congress, January 2020, p. 16.

[23] Discrepancies may exist between EIA data on net imports compared to the IEA methodologies for meeting the 90-day calculation. For more on IEA methodology, see International Energy Agency, "Methodology," at https://www.iea.org/articles/oil-stocks-of-iea-countries.

[24] Department of Energy, *Strategic Petroleum Reserve Annual Report for Calendar Year 2014*, December 2016, p. 18.

drawdown was in early 1991 (the Persian Gulf War). During the Persian Gulf War the peak lost production was around 4.3 million barrels per day of combined Iraqi and Kuwaiti crude oil.[25]

Refilling the SPR after an ordered drawdown remains at presidential discretion. This might be done at a time when the price of crude oil declines, or political and market conditions make it economically advantageous to do so. For example, to replace inventories sold in 2005 in response to Hurricane Katrina, DOE purchased crude oil on the open market in 2009. More recently, DOE purchased crude oil in 2015 to refill sold inventory during the 2014 test sale.[26]

The IEA obligates its members to hold a 90-day supply equivalent to net imports. The SPR infrastructure has a drawdown maximum of 396 million barrels over a 90-day period. If the U.S. obligation (previous year's net imports) were to exceed 396 million barrels, it could not draw it all down within 90 days. As long as the supply disruption remains below the maximum drawdown rate and others (countries or industry) are able to supply the market, there may not be cause for concern. Alternatively, Congress could authorize an expansion of SPR infrastructure to increase the maximum drawdown rate.

SPR Authorities

Authority for drawdown and sale of petroleum from the SPR is codified into law under 42 U.S.C. §6241. There are several authorized reasons to release oil from the SPR. Presidential authority to authorize a drawdown depends on (1) making the determination that a severe energy supply interruption *exists* or (2) a finding that a drawdown would *prevent* an impact of a severe domestic supply disruption. Further, IEP obligates the United States to join in an IEA-coordinated response to a supply disruption. Other sales have been authorized for various reasons including to generate revenue to reduce the budget deficit, to test the functionality of the SPR, and to fund the modernization of the SPR. Additionally, authorities exist for the acquisition of crude oil to fill the SPR, and the option for exchanges in specific scenarios outlined below.

Once a drawdown is authorized, DOE releases SPR oil by conducting a public sale to the highest bidder in a competitive auction. DOE publishes a "notice of sale" that includes the volume, characteristics, and location of the petroleum for sale; delivery dates and procedures for submitting offers; and measures for assuring performance and financial responsibility. Bids are reviewed by DOE and awards offered. DOE estimates that oil could enter the market roughly two weeks after the appearance of a notice of sale.

Through 2019, the SPR released over 230 million barrels for various purposes (**Figure 2**). Presidents have ordered releases on three occasions, some 58.9 million barrels in total, in response to severe energy supply interruptions in coordination with other IEA member countries. The SPR has also provided exchanges totaling around 75 million barrels through 2019 to mitigate temporary supply interruptions. The borrowers repay their loans by replacing the crude oil plus an additional smaller volume as a premium. The SPR has had three test sales. In 2014, DOE initiated a test sale to determine if recent infrastructure changes could impact the SPR's drawdown capabilities and to exercise sales procedures. The test ran successfully with some lessons learned, including some pipeline and storage capacity limitations.[27] A number of other sales reached

[25] U.S. Energy Information Administration, "Effects of Crude Oil Supply Disruptions: How Long Can They Last," Today in Energy, March 30, 2011.

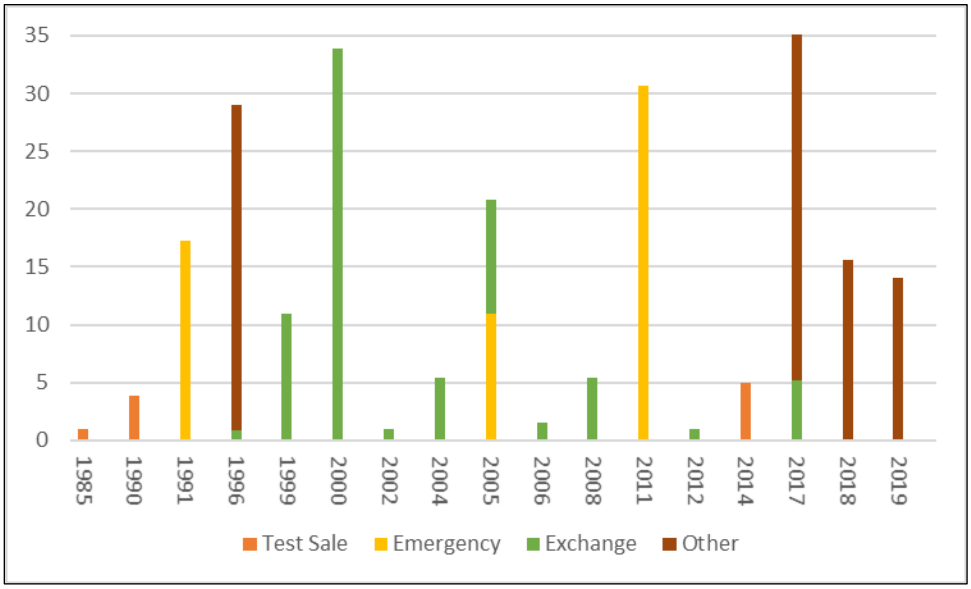
[26] U.S. Department of Energy, "Filling the Strategic Petroleum Reserve," available at https://www.energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve/filling-strategic-petroleum-reserve.

[27] U.S. Department of Energy, *Strategic Petroleum Reserve Annual Report for Calendar Year 2014*, Report to Congress, December 2016, p. 21.

around 88 million barrels through 2019 were authorized for various reasons (e.g., to generate revenue to reduce the budget deficit as well as to modernize the SPR).

Figure 2. SPR Releases by Type Through 2019

Millions of Barrels



Sources: U.S. Department of Energy, "Historical SPR Oil Sales and Exchanges," at https://www.energy.gov/sites/prod/files/2018/08/f54/Historical%20SPR%20Oil%20Sales%20and%20Exchanges_Aug%202018.pdf, and U.S. Department of Energy, "History of SPR Releases," https://www.energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve/releasing-oil-spr.

Notes: Totals may not add due to rounding. There were no releases prior to 1985.

Emergency Drawdowns

The 1975 EPCA authorizes drawdown of the SPR by obligation under the IEP or upon a finding by the President that there is a "severe energy supply interruption." Codified in law under 42 U.S.C. §6241(d)(2), such an interruption *exists* when the President determines that

> A. An emergency situation exists and there is a significant reduction in supply which is of significant scope and duration;
>
> B. A severe increase in the price of petroleum products has resulted from such emergency situation; and
>
> C. Such price increase is likely to cause a major adverse impact on the national economy.[28]

One recent example of a coordinated IEA release occurred in 2011 to offset a curtailment in Libya's supply of crude during the First Libyan Civil War. The IEA announced a total release from all member countries of 60 million barrels.[29] In accordance with IEA obligations and as directed by the President under the authority of 42 U.S.C. §6241(d)(2), the U.S. Department of Energy Secretary Chu announced a sale of 30 million barrels from the SPR.

[28] 42 U.S.C. §6241(d)(2).

[29] For more information, see U.S. Department of Energy, Office of Fossil Energy, "History of SPR Releases," at https://www.energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve/releasing-oil-spr#TestSales.

In 1990, Congress amended EPCA via P.L. 101-383 to extend SPR drawdown and sales in the event of a domestic supply interruption. In 1989, the Exxon Valdez oil spill interrupted the shipment of Alaskan oil, triggering spot shortages and price increases. The amendment expanded authorities under EPCA by providing options for an SPR drawdown to *prevent* or *reduce* the impact of a severe domestic supply interruption if the President finds that

> A. a circumstance, other than those described in subsection (d), exists that constitutes, or is likely to become, a domestic or international energy supply shortage of significant scope or duration;
>
> B. action taken under this subsection would assist directly and significantly in preventing or reducing the adverse impact of such shortage;
>
> C. the Secretary has found that action taken under this subsection will not impair the ability of the United States to carry out obligations of the United States under the international energy program; and
>
> D. the Secretary of Defense has found that action taken under this subsection will not impair national security.[30]

This authority limits the Secretary of Energy to selling no more than 30 million barrels of SPR petroleum over a maximum 60-day period. Additionally, the authority permits a drawdown only when the SPR inventory is above 340 million barrels.[31]

Test Sale

Under 42 U.S.C. §6241(g), the Secretary of Energy is authorized to test a drawdown and sale or exchange from the SPR to conduct an evaluation of the procedures. Tests have a maximum limit of up to 5 million barrels.[32] Under law, the Secretary of Energy determines the appropriate sale price and it may not be at a price less than 95% of comparable crude oil sold at the time. The statute requires the Secretary of Energy to notify Congress 14 days before a test.

Acquisitions and Exchanges

Since 1975, the Secretary of Energy has had several authorized methods to acquire petroleum for the SPR: direct purchases, royalty-in-kind transfers (RIK), deferrals and exchanges, or other means. The Secretary of Energy is authorized specific powers (including oil acquisition) outlined in 42 U.S.C. §6239 in order to maintain and operate the SPR. Initially, through an interagency agreement, the Department of Defense, on behalf of DOE, acquired crude oil for the SPR using appropriated funds to meet congressionally mandated target fill rates until those funds were exhausted.[33]

By December 1994, the SPR had been filled to 591.7 million barrels.[34] Purchases for the SPR were then suspended to divert funds to SPR maintenance and life extension. Starting in 1999,

[30] 42 U.S.C. §6241(h)(1).

[31] Congress amended the minimum inventory requirement three times: (1) with Section 5010 of P.L. 114-255 from 500 million barrels to 450 million barrels; (2) with Section 30204 of P.L. 115-123 from 450 million barrels to 350 million barrels; and (3) with Section 501 of P.L. 115-141 from 350 million barrels to 340 million barrels.

[32] 42 U.S.C. §6241(g).

[33] Department of Energy, "Final Rule: Procedures for the Acquisition of Petroleum for the Strategic Petroleum Reserve," 71 *Federal Register* 65376, November 8, 2006, pp. 65376-65383.

[34] Department of Energy, "History of the Strategic Petroleum Reserve," available at https://www.energy.gov/articles/history-strategic-petroleum-reserve.

filling of the SPR resumed via an RIK program. As an alternative to appropriated funds, DOE proposed accepting transfers of a portion of the royalty payments collected by the Department of the Interior (DOI) for Gulf of Mexico crude oil leases in the form of RIK crude oil rather than as revenues. While RIK avoided the necessity of making outlays for purchasing crude oil, it equivalently reduced royalty revenues by settling obligations in oil rather than in payments to the U.S. Treasury.[35] In mid-November of 2001, President George W. Bush ordered the SPR filled to 700 million barrels, principally through crude oil acquired as RIK. Between fiscal year (FY) 2000 through FY2007, DOI estimates that RIK deliveries totaled roughly $4.6 billion.[36] In 2009, Secretary of the Interior Ken Salazar announced the end of the RIK program.[37]

Additionally outlined in 42 U.S.C. §6240 are the various objectives and procedures for the Secretary of Energy to acquire crude oil for the SPR. Within the parameters codified into law, the Secretary may acquire petroleum products through purchase or exchange. For purchase, Congress must appropriate funds to the SPR. During an exchange (also sometimes referred to as a loan), an entity borrows SPR crude and later replaces it with a similar quality crude, "plus payment of an in-kind premium determined according to the period negotiated for return."[38] An entity can request an exchange if unexpected circumstances impede crude oil supplies and no other alternative is available.[39]

Mandated and Modernization Sales

In 2015, Congress began mandating sales of SPR oil. Mandated sales direct the Secretary of Energy to sell a specified quantity of SPR oil.[40] There are mandated quantities prescribed for specific fiscal years from 2017 through 2028. Proceeds from mandated sales are deposited into the general fund of the U.S. Treasury. Since 2015, Congress has enacted seven laws containing provisions mandating the sale of SPR oil.[41] These mandated sales from the SPR have committed 271 million barrels of oil for sale through FY2028. Actual sales through FY2019 total 34.93 million barrels, nearly consistent with the mandated sales required by enacted legislation of 35 million barrels.

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[35] Government Accountability Office, "Strategic Petroleum Reserve Options to Improve the Cost-Effectiveness of Filling the Reserve," Testimony Before the Senate Committee on Energy and Natural Resources, Statement of Frank Rusco, Acting Director Natural Resources and Environment, February 26, 2008.

[36] Ibid., p. 9.

[37] Department of the Interior, "Salazar Ends Controversial Royalty in Kind Program," press release, September 16, 2009, available at https://www.doi.gov/news/pressreleases/Salazar-Ends-Controversial-Royalty-in-Kind-Program.

[38] U.S. Department of Energy, Office of Fossil Energy, "Guidance for Requesting Emergency Oil Exchange from the SPR," at https://www.energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve/guidance-requesting-emergency-oil.

[39] U.S. Department of Energy, Office of Fossil Energy, "Guidance for Requesting Emergency Oil Exchange from the SPR," at https://www.energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve/guidance-requesting-emergency-oil.

[40] For more detail on mandated and modernization sales, see CRS Congressional Distribution Memo CD1308862, *Strategic Petroleum Reserve: Mandated and Modernization Oil Sales*, by Phillip Brown and Heather L. Greenley (available to congressional clients from authors), and CRS Report R45577, *Strategic Petroleum Reserve: Mandated Sales and Reform*, by Robert Pirog.

[41] Bipartisan Budget Act of 2015 (P.L. 114-74 Section 404); Fixing America's Surface Transportation (FAST) Act (P.L. 114-94 Section 32204); 21st Century Cures Act of 2016 (P.L. 114-255 Section 5010); An Act to Provide for Reconciliation Pursuant to Titles II and V of the Current Resolution on the Budget for Fiscal Year 2018 (P.L. 115-97 Section 50003); Bipartisan Budget Act of 2018 (P.L. 115-123 Section 20101); Consolidated Appropriations Act, 2018 (P.L. 115-141 Section 501); and America's Water Infrastructure Act of 2018 (P.L. 115-270 Section 3009).

In addition to mandated sales, modernization sales under various laws authorize the Secretary of Energy to draw down and sell SPR oil with sales restricted by a total dollar amount, rather than volume of oil, from FY2017 through FY2020. Proceeds from these sales are to be deposited in the Energy Security and Infrastructure Modernization Fund (ESIMF). Law requires the fund to be used for construction and maintenance of SPR facilities. Statutes that authorized SPR modernization crude oil sales, and appropriated money to the ESIMF, are for fiscal years 2017 through 2019.[42]

Policy Considerations

Congress originally created the SPR to provide security against severe petroleum supply interruptions and to adhere to IEP obligations. The SPR's role has expanded over the years as conditions in the U.S. and world oil market have changed. Today those market conditions continue to shift and as such, Congress may consider further modifications to SPR legislation.

Some policy considerations include

- If the United States maintains net export status, should Congress reconsider the size of the SPR? Further, U.S. public and commercial oil stocks are well over the 90-day IEP obligation. However, some view the oil in the SPR as a national security asset that the United States should maintain at current levels.[43]
- Releases from oil reserves tend to balance supply disruptions in the short term and provide psychological support to the market that may stabilize oil prices. Should Congress consider expanding the role of the SPR to provide economic security by alleviating extreme price volatility?

Given the change in conditions, Congress may consider different options for utilizing the SPR. The section that follows discusses some of these developments and possible policy options.

Size of the SPR

The role of the United States in the global oil market has shifted since the 1970s during a time of rapidly rising prices and perceived resource scarcity. In addition to creating the SPR, Congress, through the EPCA, restricted U.S.-produced crude oil exports. Trade policy with respect to oil has undergone significant changes in recent years to accommodate technological and market developments. As the U.S. oil market moved toward higher production levels, some policies have come into question. Consequently, in December 2015, Congress passed the Consolidated Appropriations Act, 2016 (P.L. 114-113) which repealed Section 103 of EPCA (P.L. 94-163), removing any restrictions to crude oil exports.[44]

[42] These laws include Further Continuing and Security Assistance Appropriations Act, 2017 (P.L. 114-254), which allows sales up to $375.4 million; Bipartisan Budget Act of 2018 (P.L. 115-123), which allows sales up to $350 million; and Energy and Water, Legislative Branch, and Military Construction and Veterans Affairs Appropriations Act, 2019 (P.L. 115-244), which allows sales up to $300 million.

[43] Chairman Lisa Murkowski, "Murkowski: Strategic Petroleum Reserve Is a Vital National Asset," U.S. Senate Energy Committee on Energy and Natural Resources, Republican News, at https://www.energy.senate.gov/public/index.cfm/2019/10/murkowski-strategic-petroleum-reserve-is-a-vital-national-asset, October 17, 2019.

[44] See CRS Report R44403, *Crude Oil Exports and Related Provisions in P.L. 114-113: In Brief*, by Phillip Brown, John Frittelli, and Molly F. Sherlock.

Net Export Status

Net-exporters of oil do not have a stockholding obligation under the IEP.[45] Some have noted that with the reduction of net imports, the size of the SPR could be reconsidered.[46] For similar reasons to lifting restriction on crude oil exports, and with the relatively recent increases in domestic crude oil production, some stakeholders see less need for an oil stockpile.[47] They contend the change in oil markets warrants a reduction in the size of that stockpile. U.S. crude oil and petroleum product imports have been in decline. The EIA reports that in September 2019, the United States exported 89,000 million barrels per day more crude oil and petroleum products than it imported.[48] The EIA further projected that, in most forecasts, the United States will be a net petroleum exporter on an annual basis around 2020.[49] However, even if the United States reaches net export status, EIA and IEA projections indicate that the United States may return to a net importer between 2040 and 2050.[50]

Some contend maintaining the stockpile has value, regardless of net export status. For instance, Keisuke Sadamori, IEA's Director for Energy Markets and Security, testified during a Senate hearing in 2019,

> oil security is not only an issue for net-importers, and security concerns such as regional extreme weather events and terrorist attacks can affect all countries. In a global market, even in net exporting countries, oil consumers will be economically harmed by spiking oil prices, and if a disruption tips the world economy into recession, the pain will be felt by exporting and importing countries alike.[51]

Finally, the United States is not guaranteed to remain a net exporter indefinitely. In May 2018, the Government Accountability Office (GAO) released a report on the future of the SPR analyzing DOE's planning approach.[52] GAO recommended that DOE should expand or amend their planning approach to include "an additional analysis that takes into account private-sector response, oil market projections, and costs and benefits of a wide range of different SPR sizes."[53]

Additionally, market conditions may be changing. Since January 2020, oil prices have fallen due to of a number of factors including overproduction and constrained demand, largely due to a reduction in travel from the COVID-19 pandemic. Prolonged periods of depressed prices could affect U.S. oil production, exports, employment, and industry consolidation. If U.S. production

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[45] International Energy Agency, "The Global Oil Market Remains Vulnerable to a Wide Range of Risk Factors," Oil Security, November 27, 2019, available at https://www.iea.org/areas-of-work/ensuring-energy-security/oil-security.

[46] Tsvetana Paraskova, "Energy Secretary Perry: U.S. Might Want to Reduce Strategic Petroleum Reserve," OilPrice.com, April 3, 2019, available at https://oilprice.com/Latest-Energy-News/World-News/Energy-Secretary-Perry-US-Might-Want-To-Reduce-Strategic-Petroleum-Reserve.html.

[47] Steve Hanke, "Trump: Transform the U.S. Strategic Petroleum Reserve into an Oil Bank," *Forbes*, September 27, 2019.

[48] U.S. Energy Information Administration, "U.S. Petroleum Exports Exceed Imports in September," Today in Energy, December 5, 2019.

[49] U.S. Energy Information Administration, *Annual Energy Outlook 2019*, 2019, p. 66. These projections were made before the occurrence of the coronavirus pandemic and subsequent oil market effects.

[50] Government Accountability Office, *Strategic Petroleum Reserve, DOE Needs to Strengthen Its Approach to Planning the Future of the Emergency Stockpile*, GAO-18-477, May 2018.

[51] Keisuke Sadamori, Director, Energy Markets and Security, International Energy Agency, Testimony before the Senate Energy and Natural Resources Committee, October 17, 2019.

[52] Government Accountability Office, *Strategic Petroleum Reserve, DOE Needs to Strengthen Its Approach to Planning the Future of the Emergency Stockpile*, GAO-18-477, May 2018.

[53] Ibid., p. 32.

and subsequently exports were to decline, the prospect of the United States becoming a net exporter may be delayed or eliminated.

Public vs. Commercial Stocks

IEA members can use both public and commercial stocks to meet their 90-day obligation. In January 2020, the United States had 423 days of net imports of commercial crude oil stocks, equaling around 697 days when combined with SPR stocks, according to IEA methodology. Both public and privately held oil stocks have important roles to play in providing security in times of oil market disruptions. Similarly, both public and private oil stocks have some role in oil price determination and movements. As the world oil market and the U.S. market evolve, it is reasonable to reassess the role of each of these components of U.S. energy security.

Management of commercial stocks can affect the price of oil in multiple ways. These effects are limited by the storage capacity of the system as a whole, but that capacity can be augmented or reduced. Numerous oil industry firms hold commercial stocks of crude oil at refineries, bulk terminals, and in pipelines. The purpose of these stocks is to ensure the continuous operation of the refining industry, which transforms crude oil into petroleum products used by consumers. Commercial oil companies are more likely to store oil for the short-term, rather than as a long-term security stock. Some experts contend that commercial stocks cannot provide a level of security proportional to that of the SPR.[54]

The role of sales from the SPR into the commercial market during a supply disruption is linked to the size of commercial stocks and the availability of additional production capacity. Generally, the level of private oil stocks closely follows the level of oil production and changes in the price of oil. If global supply is greater or less than current demand, commercial stocks of oil may rise or fall accordingly. In a market where there is no physical shortage, oil companies may have limited interest in purchasing SPR oil unless they want to build crude oil stocks or have spare refining capacity to turn the crude into useful products. Conversely, during a supply disruption, commercial stocks would likely move to market before the SPR, as DOE must solicit buyers through a Notice of Sale. Further, the SPR takes approximately 13 days from an initial decision to hold a sale to ultimate delivery of that oil. For instance, in response to the attack against Saudi Arabia's oil production in September 2019, President Trump authorized the release of oil from the SPR, as needed. In response to prior events, presidents have ordered a release in coordination with other IEA member countries. In this case, the IEA did not announce a coordinated release, but monitored the situation closely. Although the United States had the capacity to replace most of the Saudi oil taken off the market by the attack, no release from the SPR occurred as commercial stocks supplied the market and prices stabilized.

Generally, according to GAO, most experts interviewed in the May 2018 report agreed that the private sector is in a better position to respond to supply disruptions than they were in the 1970s.[55] Conversely, DOE noted in the same report that the United States does not have a requirement for the private sector to respond to a supply disruption. Further, according to GAO, DOE does not have analysis on how the private sector would respond to supply disruptions.[56]

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[54] Jason Bordoff, Antoine Halff, and Akos Losz, *New Realities, New Risks: Rethinking the Strategic Petroleum Reserve*, Columbia SIPA, May 30, 2018.

[55] For information on those interviewed, see Government Accountability Office, *Strategic Petroleum Reserve, DOE Needs to Strengthen Its Approach to Planning the Future of the Emergency Stockpile*, GAO-18-477, May 2018, p. 5.

[56] Government Accountability Office, *Strategic Petroleum Reserve, DOE Needs to Strengthen Its Approach to Planning the Future of the Emergency Stockpile*, GAO-18-477, May 2018, p. 20.

Price Volatility

Petroleum is a globally traded commodity and subject to international demand and supply conditions. Volatility in crude oil prices can disrupt or enable oil industry investments and production—factors that can have a ripple effect on the global economy. However, the storage of petroleum can provide some price relief or even alleviate a physical shortage of supply to certain consumers (e.g., the military, strategic industries). Congress's motivation in creating the SPR focused on a deliberate and dramatic physical supply *disruption* and on mitigating the economic effects of a shortage stemming from international events. As market conditions continue to change, Congress may consider options for utilizing the SPR in an *oversupplied* low oil price environment.

Low Price Environment

Global oil prices declined nearly 60% between January and mid-April 2020,[57] as a result of a number of factors. These factors included reduced demand and economic impacts related to the evolving COVID-19 pandemic, and the failure of OPEC and a group of non-OPEC countries (OPEC+), including Russia, to come to an agreement regarding oil production during their March 2020 meeting. While low oil prices are generally positive for consumers (translating into lower gasoline prices) and oil refiners (translating into lower costs), sustained low prices could result in financial stress for companies operating in the U.S. oil exploration and production (E&P) sector. Due to these recent developments, a plan to sell crude oil—as required in FY2020 by P.L. 116-94—from the SPR was suspended.[58]

Discussions transitioned from selling oil from the SPR to purchasing oil to fill it to capacity. Acquiring crude oil—direct purchases or royalty-in-kind—for SPR storage could absorb a limited amount of market oversupply. Physical SPR capacity is approximately 713.5 million barrels, while actual inventories are 635 million barrels.[59] At the direction of President Trump, DOE issued a solicitation to purchase an initial 30 million barrels of crude oil as part of a plan to acquire 77 million barrels. However, on March 25, 2020, DOE cancelled this solicitation, noting, "Given the current uncertainty related to adequate Congressional Appropriations for crude oil purchases associated with the March 19, 2020 solicitation, the Department is withdrawing the solicitation. Should funding become secure for the planned purchases, the Department will reissue the solicitation."[60]

Whether increasing SPR inventories might contribute to oil market rebalancing is uncertain. Even if Congress appropriated funding to purchase crude oil, the SPR's available capacity is limited (currently around 77 million barrels) and the impact could be marginal depending on a number of factors (i.e., duration and volume of crude oil oversupply).[61] However, Congress authorized the

[57] See CRS Insight IN11246, *Low Oil Prices and U.S. Oil Producers: Policy Considerations*, by Phillip Brown and Michael Ratner.

[58] U.S. Department of Energy, "DOE Statement on Upcoming SPR Crude Oil Sale," press release, March 10, 2020.

[59] U.S. Department of Energy, "Department of Energy Executes on Direction of President Trump, Announces Solicitation to Purchase Crude Oil for the SPR to Provide Relief to American Energy Industry," press release, March 19, 2020.

[60] U.S. Department of Energy, Amendment of Solicitation, 89243520RFE000015, March 25, 2020, available at https://www.spr.doe.gov/doeec/2020-03_CrudeOilPurchase/Docs/89243520RFE000015_Amendment_0001.pdf.

[61] Myra P. Saefong, "The U.S. Wants to Stabilize Oil Prices. It Might Be Too Late," *Barron's*, May 1, 2020.

SPR to store up to 1 billion barrels.[62] While not an immediate solution, Congress could consider appropriating funds to expand the SPR's physical capacity to the authorized 1 billion barrels.[63]

On April 2, 2020, DOE (under exchange authority 42 U.S.C. §6239(f)(5)) announced a solicitation for the storage of 30 million barrels in exchange for a fixed premium of barrels, returning the difference by March 31, 2021.[64] This would allow crude oil to be temporarily stored in the SPR sites, potentially providing some financial relief to some U.S. producers. Several petroleum associations applauded the effort, stating, for example, "The oil producers of Louisiana praise the President, his administration, and Louisiana's federal delegation for taking swift, decisive action to help support the nation's energy producers with the SPR's exchange for storage."[65]

However, challenges remain, as spare storage capacity at Cushing, OK (the designated delivery point for NYMEX crude oil futures contracts) is limited or unavailable.[66] The futures price is a contract, usually monthly, for delivery of a certain amount of crude oil, on a specified date in the future, and at a particular location (Cushing, OK, for West Texas Intermediate (WTI) crude oil). As available storage becomes more limited, futures prices may continue to fall as owners of crude oil discount their price in order to entice buyers. This apparently was the case with WTI where some traders grew concerned over storage availability in Cushing, forcing some to sell their futures contracts. Despite federal efforts to make capacity available at the SPR and other measures, Cushing storage capacity is a key factor for WTI prices.

When acquiring petroleum for the SPR, the Secretary is to consider, to the extent possible, four objectives under 42 U.S.C. §6240. Among these, the Secretary is to minimize market impacts from purchases. Acquiring SPR crude oil to reduce oversupply and increase prices could conflict with that objective. However, the degree of impact on the market may be hard to determine, and a threshold level is not explicitly defined. Furthermore, included in DOE's objectives is to minimize the cost and presumably—depending on prices in March 2021 when the above noted exchange expires—DOE's exchange could result in a comparatively low-cost petroleum acquisition.

High Price Environment

Crude oil price increases generally result from actual or anticipated market tightening; that is, an increase in demand, a reduction in supply, or both. There is a general recognition that a release from the SPR would likely only provide temporary relief from rising prices; however, high prices alone are not an authorized circumstance to trigger a release from the SPR. High prices are generally a consequence of a severe supply interruption. For instance, in 2011, the price increases

[62] 42 U.S.C. §6231

[63] A large expansion of the SPR could take years as DOE would need to complete a range of tasks, including: identify and select a new storage site, complete any necessary federal and state processes (e.g., National Environmental Policy Act compliance, etc.), develop the site and the necessary infrastructure to deliver oil to and from the site, and fill the new capacity.

[64] For more information and the fixed premiums, see U.S. Department of Energy, *Exchange for Storage of Thirty (30) Million Barrels of Crude Oil Produced in the U.S. for the Strategic Petroleum Reserve*, Request for Proposal DE-RP96-20PO00001, April 2, 2020.

[65] U.S. Department of Energy, "U.S. Department of Energy to Make Strategic Petroleum Reserve Storage Capacity Available to Struggling U.S. Oil Producers," April 2, 2020.

[66] CRS Insight IN11354, *Crude Oil Futures Prices Turn Negative*, by Michael Ratner and Heather L. Greenley.

were thought to be largely attributable to the loss of Libyan production during the revolution in that country.

The judgment that a release of crude oil from the SPR provides some temporary relief from rising prices seems well founded. The U.S. government bases its notice of sale on the previous five-day average of the price of the grade of crude oil it intends to sell, and accepts bids it considers responsive. If the notice itself does not prompt, or contribute to, a softening of prices, there may be limited interest on the part of the oil industry in bidding on SPR supply. Although the possibility exists that prices might decline if additional refined product is released into the market, it is impossible to predict what long-term quantitative effect an SPR crude drawdown would have. For example, in response to prolonged oil supply disruption from the Libyan Civil War, the IEA coordinated a petroleum release on June 23, 2011. Following the announcement of a 30 million barrel release of oil from the SPR, the price of crude oil declined by about 5% that day.[67] About one week later, prices began to exceed pre-announcement levels.

The announcement of the SPR release stated that the oil would be delivered to market by the end of August 2011. Oil prices began to decline in that month and generally declined through September 2011. However, several other factors may have contributed to the price of crude oil. For instance, the prices of crude oil declined in May 2011 following the death of Osama bin Laden and a rise in the U.S. dollar.[68]

Some observers do not support use of the SPR to mitigate high crude oil prices. These observers prefer allowing the market to resolve itself and for government not to intervene.[69] Further, observers may contend that market conditions and current and anticipated geopolitical events are affecting prices more than short-term physical supply concerns or that speculative bidding in the oil commodity futures market has driven price volatility more than the current supply-demand balance. In this context, use of the SPR would have limited impact on market conditions.

Congress could reduce the size of the SPR and sell off excess petroleum for the benefit of other programs while still maintaining the 90-day net import requirement. However, determining the optimal level of oil holdings in the SPR is likely to remain controversial. Analytical tools common in public policy analysis, such as cost-benefit analysis, dynamic programming, or other optimization techniques, depend on determining the value of variables that are highly uncertain in this case.[70] The responsiveness of the adjustment of oil quantities on both the demand and the supply sides of the market, the price volatility of oil, and the probabilities of different degrees of political/military disruption in the oil market are all uncertain. In addition the 90-day net import requirement is a dynamic calculation based on a combination of market factors.

[67] U.S. Energy Information Administration, "Petroleum and Other Liquids-Daily Spot Prices," online database, at https://www.eia.gov/dnav/pet/pet_pri_spt_s1_d.htm.

[68] For the most part oil is traded in the U.S. dollar. A change in the value of the U.S. dollar changes the cost of oil. Robert Gibbons, "Oil Slips in Volatile Trade After bin Laden Death," Reuters, May 1, 2011, at https://www.reuters.com/article/us-markets-oil/oil-slips-in-volatile-trade-after-bin-laden-death-idUSTRE72D01W20110502. For more information, see CRS In Focus IF10386, *Oil Prices and the Value of the Dollar*, by Robert Pirog.

[69] Jerry Taylor and Peter Van Doren, *The Case Against the Strategic Petroleum Reserve*, CATO Institute, November 21, 2005.

[70] For more information, see CRS Report R45577, *Strategic Petroleum Reserve: Mandated Sales and Reform*, by Robert Pirog.

Appendix. SPR Site Specifications

Bayou Choctaw

The Bayou Choctaw storage site is located in Iberville Parish, LA. The site has six storage caverns, with a storage capacity of 76 million barrels, and an inventory of 71.8 million barrels, as of April 2020.[71] The Bayou Choctaw site began full operation in 1987 and has remained operational since then. In November 2011, DOE acquired a replacement cavern for Cavern 20, after it had experienced leaching, which posed an environmental risk.[72] Bayou Choctaw has a design drawdown rate of 0.5 million barrels per day, and a design fill rate of 110 thousand barrels per day. (The other three SPR storage sites have a combined fill rate specified as 225 thousand barrels per day.)

Big Hill

The Big Hill storage site is located in Jefferson County, TX. The site has 14 storage caverns, a combined storage capacity of 170 million barrels, and a cavern inventory of 143.3 million barrels as of April 2020.[73] The Big Hill site began full operation in 1991 and has remained operational since then. Big Hill has a design drawdown rate of 1.1 million barrels per day.

Section 168 of the EPCA authorizes foreign oil to be stored in unused space to increase world oil stockpiling. In 1998, the U.S. Commerce Department designated Big Hill as a special purpose Foreign Trade Zone, which exempts foreign oil storage from customs or certain taxes.[74] DOE noted in their SPR calendar year 2016 annual report to Congress that despite this designation, Big Hill has not stored foreign oil.

Bryan Mound

The Bryan Mound storage site is located in Brazoria County, TX. The site has 19 storage caverns with a total storage capacity of 247.1 million barrels, and a cavern inventory of 230.2 million barrels as of April 2020.[75] The Bryan Mound site began operation in 1986 and has remained operational since then.

[71] U.S. Department of Energy, "SPR Storage Sites," at https://www.energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve/spr-storage-sites.

[72] U.S. Department of Energy, *Strategic Petroleum Reserve Annual Report for Calendar Year 2017*, December 2018, p. 50.

[73] U.S. Department of Energy, "SPR Storage Sites," at https://www.energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve/spr-storage-sites.

[74] U.S. Department of Energy, *Strategic Petroleum Reserve Annual Report for Calendar Year 2016*, October 2018, p. 26.

[75] U.S. Department of Energy, "SPR Storage Sites," at https://www.energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve/spr-storage-sites.

In 2013, after failing a Mechanical Integrity Test (MIT), one of Bryan Mound's then-20 storage caverns was determined to be at risk. It was subsequently emptied, bringing the total to 19 caverns. Pumping to transfer the oil to other caverns began in March 2015 and completed in December 2016. Additionally, in 2018, two of the three aboveground storage tanks at Bryan Mound were unusable and required maintenance.[76] This reduces the site's drawdown rate from 1.5 million barrels per day to 1.35 million barrels per day. According to DOE's *Strategic Petroleum Reserve Annual Report for Calendar Year 2018*, these tanks are to be converted to external floating roof tanks during the SPR Modernization Program—Life Extension 2 Project.[77]

West Hackberry

The West Hackberry storage site is located in Cameron Parish, LA. The site has 21 operable storage caverns with a combined storage capacity of 220.4 million barrels, and a cavern inventory of 189.7 million barrels as of April 2020. The West Hackberry site began full operation in 1988 and has remained operational since then.

In 2012, Cavern 6 had a well stability issue and plans to remove oil from the cavern were instituted. In December 2017, all accessible oil was transferred out of Cavern 6 to the other 21 storage caverns.[78]

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[76] Crude oil storage tanks are only at Bryan Mound for immediate crude oil received during filling/delivery or for temporary storage. For more information, see U.S. Department of Energy, *Long-Term Strategic Review of the U.S. Strategic Petroleum Reserve*, Report to Congress, August 2016.

[77] For more on the Life Extension 2 Project, see U.S. Department of Energy, *Strategic Petroleum Reserve Annual Report for Calendar Year 2016*, October 2018, p. 10.

[78] U.S. Department of Energy, *Strategic Petroleum Reserve Annual Report for Calendar Year 2017*, December 2018, p. 9.