



The Strategic Petroleum Reserve and Refined Product Reserves: Authorization and Drawdown Policy

Anthony Andrews

Specialist in Energy and Defense Policy

Robert Pirog

Specialist in Energy Economics

March 11, 2011

Congressional Research Service

7-5700

www.crs.gov

R41687

Summary

Congress authorized the Strategic Petroleum Reserve (SPR) in the Energy Policy and Conservation Act (EPCA, P.L. 94-163) to help prevent a repetition of the economic dislocation caused by the 1973-1974 Arab oil embargo. The Department of Energy (DOE) manages the SPR, which comprises five underground storage facilities, solution-mined from naturally occurring salt domes in Texas and Louisiana. The Energy Policy Act of 2005 (EPAAct) authorized SPR expansion to a capacity of 1 billion barrels, but physical expansion of the SPR has not proceeded beyond 727 million barrels — its inventory at the end of 2010. In addition, a Northeast Home Heating Oil Reserve (NHOR) holds 2 million barrels of heating oil in above-ground storage.

EPCA authorized drawdown of the Reserve upon a finding by the President that there is a “severe energy supply interruption.” Congress enacted additional authority in 1990 (Energy Policy and Conservation Act Amendments of 1990, P.L. 101-383) to permit use of the SPR for short periods to resolve supply interruptions stemming from situations internal to the United States. The meaning of a “severe energy supply interruption” has been controversial. EPCA intended use of the SPR only to ameliorate discernible physical shortages of crude oil.

The government had ended the practice of purchasing crude oil to fill the SPR in 1994. In 2000, the Department of Energy began acquiring SPR oil through royalty-in-kind (RIK) in lieu of cash royalties paid on production from federal offshore leases. In May 2008, Congress passed legislation (P.L. 110-232) ordering DOE to suspend RIK fill for the balance of the calendar year unless the price of crude oil dropped below \$75/barrel. Crude oil prices spiked to \$147/barrel in the summer of 2008 and then sharply declined, allowing a resumption of fill. These activities have brought the SPR essentially to its current 727 million barrel inventory. The current Secretary of the Interior recently announced his intention to terminate the RIK program.

Congress approved \$205 million for the SPR in FY2009, including \$31.5 million to continue SPR physical expansion activities. DOE has evaluated a site in Richton, MS, as a possible location for an additional 160 million barrels of capacity, but set aside any further expansion plans. The FY2010 Energy and Water Appropriations Act (P.L. 111-85), which provides \$243.8 million for the entire SPR program, included \$25 million for expansion activities and \$43.5 million for purchase of a cavern at Bayou Choctaw to replace a cavern posing environmental risks. The act also prohibits SPR appropriations from being expended to anyone engaged in providing refined product to Iran, or assisting Iran in developing additional internal capacity to refine oil.

Historically, the use of the SPR has been tied to a physical supply shortage, which normally would manifest itself, in part, as a price increase. The original intention of the SPR was to create a reserve of crude oil stocks that could be tapped in the event of an interruption in crude supply. However, price was deliberately kept out of the President’s SPR drawdown authority because of concerns about what price level would trigger a drawdown, and that any hint of a price threshold could influence private sector and industry inventory practices. The original intention of the SPR was to create a reserve of crude oil stocks that could be tapped in the event of an interruption in crude supply.

The Government Accountability Office recently observed that the proportion of crude oil grades in the SPR has been growing less compatible with the heavier grades of crude oil that U.S. refineries have been upgrading to handle. This finding has raised questions about the SPR’s effectiveness during a long-term oil disruption involving heavy oil.

Contents

Introduction	1
Establishment of the SPR.....	1
SPR Drawdown Authorities	3
Acquisition of Crude Oil for the SPR	4
Royalty-in-Kind Acquisition	4
Royalty-in-Kind Termination	5
The Northeast Home Heating Oil Reserve.....	6
SPR Expansion	7
Bayou Choctaw.....	7
Richton Dome.....	8
The Debate Over When the SPR Should Be Used.....	8
Use of the SPR in the Persian Gulf War (1990).....	9
Hurricanes and Changes in the Market Dynamics (2005-2008).....	10
Summer 2008 Call for an SPR Drawdown.....	11
Political Unrest in the Middle East and North Africa (MENA) 2011	11
Other Policy Considerations	12
Legislation in the 111 th Congress	14
Proposals in the 112 th Congress	14

Contacts

Author Contact Information	15
Acknowledgments	15

Introduction

The recent unrest in the Middle East and North Africa (MENA), disruption in Libyan crude oil production, and rising crude oil prices have led to calls for releasing oil from the Strategic Petroleum Reserve (SPR). In late February, some House members advocated a release as a move to prevent price speculation.¹ More recently, some Senate members formally wrote to the President to urge his exercise of emergency powers to release SPR oil.² The Obama Administration is currently considering releasing SPR oil to help ease soaring oil prices and consumer fears over rising gasoline prices. Despite the rising prices, considerable spare capacity and substantial reserves exist worldwide. Up until the last quarter of 2010, the United States had experienced both a drop in crude oil demand and reduced refining output. Auctioning SPR oil may have a limited influence on crude oil prices and find less-than-enthusiastic bidders.

Establishment of the SPR

From the mid-1970s through the present day, the United States has had to absorb a number of significant spikes in the price of crude oil and petroleum products.³ Whether driven by disruptions in the physical supply of crude or refined fuels, or by uncertainties owing to international conflicts and instabilities, these price increases have consequences for the United States. Elevated petroleum prices affect the balance of trade and siphon away disposable income that might be spent to support spending, investment, or savings.

The U.S. Strategic Petroleum Reserve (SPR) originated in the disruption of the 1973 Arab-Israeli War. In response to the United States' support for Israel, the Organization of Arab Exporting Countries (OAPEC) imposed an oil embargo on the United States, the Netherlands, and Canada, and reduced production. While some Arab crude did reach the United States, the price of imported crude oil rose from roughly \$4/barrel (bbl) during the last quarter of 1973 to an average price of \$12.50/bbl in 1974. While no amount of strategic stocks can insulate any oil-consuming nation from paying the market price for oil in a supply emergency, the availability of strategic stocks can help blunt the magnitude of the market's reaction to a crisis. One of the original perceptions of the value of a strategic stockpile was also that its very existence would discourage the use of oil as a political weapon. The embargo imposed by the Arab producers was intended to create a very discernible physical disruption. This explains, in part, why the genesis of the SPR

¹ George Lobsenz, "House Democrats to Obama: Tap SPR to Stop Speculators," *The Energy Daily*, February 25, 2011, p. 1, Vol. 39, No. 38.

² "Senators Ask Obama for Swift Action to Lower Gas Prices," March 4, 2011, Senator Jeff Merkley, <http://merkley.senate.gov/newsroom/press/release/?id=F3401222-9994-455F-9BA9-BFD604ADCAF0>.

³ These have included the Arab oil embargo (1973-1974), the deposing of the Shah of Iran, followed by the Iranian revolution (1979-1980), the first Gulf War (1990), and production cuts by the Organization of the Petroleum Exporting Countries (OPEC) and a resurgence in world oil demand (early 1999 into the fall of 2000). Starting in 2003 with the U.S. invasion of Iraq, crude oil and product prices began rising to a new nominal high reached in the summer of 2008—owing to a blend of speculation in the futures market and adjustment in the real buying power of the U.S. dollar. Some of the dynamics behind more recent prices are linked to natural events (such as Hurricanes Rita, Katrina, and Gustav) that disrupted Gulf Outer Continental Shelf (OCS) oil production and the 2010 BP Macondo well blowout that resulted in a moratorium on OCS drilling permits. The latest rise, at the time of this paper, may depend on how events in Libya play out.

focused especially on deliberate and dramatic physical disruptions of oil flow, and on blunting the significant economic impacts of a shortage stemming from international events.

In response to the experience of the embargo, Congress authorized the Strategic Petroleum Reserve in the Energy Policy and Conservation Act (EPCA, P.L. 94-163) to help prevent a repetition of the economic dislocation caused by the Arab oil embargo. In the event of an interruption, introduction into the market of oil from the Reserve was expected to help calm markets, mitigate sharp price spikes, and reduce the economic dislocation that had accompanied the 1973 disruption. In so doing, the Reserve would also buy time for the crisis to sort itself out or for diplomacy to seek some resolution before a potentially severe oil shortage escalated the crisis beyond diplomacy. The SPR was to contain enough crude oil to replace imports for 90 days, with a goal initially of 500 million barrels in storage. In May 1978, plans for a 750-million-barrel Reserve were implemented. Later authorization expanded it to 1 billion barrels, and the George W. Bush Administration would have expanded it to 1.5 billion barrels had it been successful in persuading Congress of the need.

The Department of Energy (DOE) currently manages the program. Physically, the SPR comprises five underground storage facilities, hollowed out from naturally occurring salt domes, located in Texas and Louisiana. The caverns were finished by injecting water and removing the brine. Similarly, oil is removed by displacing it with water injection. For this reason, crude stored in the SPR remains undisturbed, except in the event of a sale or exchange. Multiple injections of water, over time, will compromise the structural integrity of the caverns.⁴ By 2005, the storage capacity of the SPR expanded to 727 million barrels, and its inventory had reached nearly 700 million barrels before Hurricanes Katrina and Rita in 2005. Following the storms, some crude was loaned to refiners and some was sold. Loans of SPR oil are “paid” by the return of larger amounts of oil than were borrowed.⁵ The SPR has since been filled to its 727 million barrel capacity through royalty-in-kind acquisition, which this report discusses further below.

SPR oil is sold competitively. A “notice of sale” is issued, including the volume, characteristics, and location of the petroleum for sale; delivery dates and procedures for submitting offers; as well as measures for assuring performance and financial responsibility. Bids are reviewed by DOE and awards offered. The Department of Energy estimates that oil could enter the market roughly two weeks after the appearance of a notice of sale.⁶

The SPR could be drawn down initially at a rate of roughly 4.4 million barrels per day for up to 90 days; thereafter, the rate would begin to decline. Although fears were expressed periodically during the 1980s about whether the facilities for withdrawing oil from the Reserve were in proper readiness, the absence of problems during the first real drawdown in early 1991 (the Persian Gulf War) appeared to allay much of that concern. However, some SPR facilities and infrastructure

⁴ Oil stored at one SPR site, Weeks Island, was transferred after problems with the structural integrity of the cavern—unrelated to drawdown activity—were discovered in the mid-1990s.

⁵ Details and current levels of SPR inventory are updated regularly at http://www2.spr.doe.gov/DIR/SilverStream/Pages/pgDailyInventoryReportViewDOE_new.html.

⁶ See <http://www.fe.doe.gov/programs/reserves/spr/spr-facts.html>. For more detail on the sales procedure, see U.S. *Federal Register*, Department of Energy, *Price Competitive Sale of Strategic Petroleum Reserve Petroleum; Standard Sales Provisions: Final Rule*, July 27, 2005, pp. 39363-39382; available at http://www.fe.doe.gov/programs/reserves/spr/spr_rule_070705.pdf. The Department of Energy has a history of SPR drawdowns, sales, and exchanges on the web at <http://www.fe.doe.gov/pr/spr/spr-drawdown.html>.

were beginning to reach the end of their operational life. A life extension program, initiated in 1993, upgraded or replaced all major systems to ensure the SPR's readiness to 2025.

The Arab oil embargo also fostered the establishment of the International Energy Agency (IEA) to develop plans and measures for emergency responses to energy crises. Strategic stocks are one of the policies included in the agency's International Energy Program (IEP). Signatories to the IEA⁷ are committed to maintaining emergency reserves representing 90 days of net imports, developing programs for demand restraint in the event of emergencies, and agreeing to participate in allocation of oil deliveries among the signatory nations to balance a shortage among IEA members. The calculation of net imports for measuring compliance with the IEA requirement includes private stocks. By that measure, the United States has more than 100 days' cushion. However, it is likely that less than 20% of the privately held stocks would technically be available in an emergency, because most of that inventory supports movement of product through the delivery infrastructure. At full capacity, the SPR might afford the United States roughly 70 days or more of net import protection, depending upon the pace of recovery of the domestic economy. These measures of days of protection assume a total cessation of oil supply to importing nations, a scenario that is highly unlikely. This would be especially true for the United States, given that Canada is currently the nation's principal source for crude oil.

Some IEA member nations require a level of stocks to be held by the private sector or by both the public and private sectors. Including the U.S. SPR, roughly two-thirds of IEA stocks are held by the oil industry, whereas one-third is held by governments and supervisory agencies.⁸

SPR Drawdown Authorities

The Energy Policy and Conservation Act (EPCA, P.L. 94-163) authorized drawdown of the Reserve upon a finding by the President that there is a "severe energy supply interruption." This was deemed by the statute to exist if three conditions were joined: If "(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."

Congress enacted additional drawdown authority in 1990 (Energy Policy and Conservation Act Amendments of 1990, P.L. 101-383) after the Exxon Valdez oil spill, which interrupted the shipment of Alaskan oil, triggering spot shortages and price increases. The intention was to provide for an SPR drawdown under a less rigorous finding than that mandated by EPCA. This section, 42 U.S.C. § 6241(h), has allowed the President to use the SPR for a short period without having to declare the existence of a "severe energy supply interruption" or the need to meet obligations of the United States under the international energy program. The Energy Policy Act of 2005 made the SPR authorities permanent. These authorities also provided for U.S. participation in emergency-sharing activities of the International Energy Agency without risking violation of antitrust law and regulation.

⁷ IEA member countries are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Republic of Korea, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States. See <http://www.iea.org/Textbase/about/membercountries.asp>.

⁸ See http://www.iea.org/Textbase/subjectqueries/keyresult.asp?KEYWORD_ID=4103.

Under the additional authorities authorized in P.L. 101-383, a drawdown may be initiated in the event of a circumstance that “constitutes, or is likely to become, a domestic or international energy supply shortage of significant scope or duration” and where “action taken ... would assist directly and significantly in preventing or reducing the adverse impact of such shortage.” This authority allows for a limited use of the SPR. No more than 30 million barrels may be sold over a maximum period of 60 days, and this limited authority may not be exercised at all if the level of the SPR is below 500 million barrels. This was the authority behind the Bush Administration’s offer of 30 million barrels of SPR oil on September 2, 2005, which was part of the coordinated drawdown called for by the International Energy Agency. The same authority may have been the model for a swap ordered by President Clinton on September 22, 2000.

Acquisition of Crude Oil for the SPR

From 1995 until the latter part of 1998, sales of SPR oil, not acquisition, were at the center of debate. However, the subsequent reduction and brief elimination of the annual federal budget deficit—as well as a precipitous drop in crude oil prices into early 1999—generated new interest in replenishing the SPR, either to further energy security objectives or as a means of providing price support to domestic producers who were struggling to keep higher-cost, marginal production in service.

Royalty-in-Kind Acquisition

As an alternative to appropriations for the purchase of SPR oil, DOE proposed that a portion of the royalties paid to the government from oil leases in the Gulf of Mexico be accepted “in kind” (in the form of oil) rather than as revenues. The Department of the Interior (DOI) was reported to be unfavorably disposed to the royalty-in-kind (RIK) proposal, but a plan to proceed with such an arrangement was announced on February 11, 1999. (Legislation had also been introduced [H.R. 498] in the 106th Congress to direct the Minerals Management Service to accept royalty-in-kind oil.) Producers were supportive, maintaining that the system for valuation of oil at the wellhead is complex and flawed. While acquiring oil for the SPR by RIK avoids the necessity for Congress to make outlays to finance direct purchase of oil, it also means a loss of revenues in so far as the royalties are settled in wet barrels rather than paid to the U.S. Treasury in cash. Final details were worked out during the late winter of 1999.

In mid-November of 2001, President Bush ordered fill of the SPR to 700 million barrels, principally through oil acquired as royalty-in-kind (RIK). At its inception, the RIK plan was generally greeted as a well-intended first step toward filling the SPR to its capacity of 727 million barrels.⁹ However, it became controversial when crude prices began to rise sharply in 2002. Some policymakers and studies asserted that diverting RIK oil to the SPR instead of selling it in the open market was putting additional pressure on crude prices. A number of industry analysts argued that the quantity of SPR fill was not enough to have driven the market. The Administration strongly disagreed with claims that RIK fill bore responsibility for the continuing spike in prices.

⁹ The SPR estimated capacity of 727 million barrels followed a reevaluation of the cavern formations and other work. Water injections into caverns when oil has been moved have added capacity, as did completion of a project to remove excess gas from stored petroleum.

Legislative attempts to suspend RIK fill began in 2004, during the 108th Congress. The Energy Policy Act of 2005 (P.L. 109-58), enacted in the summer of 2005, required the Secretary of Energy to develop and publish for comment procedures for filling the SPR that take into consideration a number of factors. Among these are the loss of revenue to the Treasury from accepting royalties in the form of crude oil, how the resumed fill might affect prices of both crude and products, and whether additional fill would be justified by national security. On November 8, 2006, DOE issued its final rule, “Procedures for the Acquisition of Petroleum for the Strategic Petroleum Reserve.” The rule essentially indicated that DOE would take into account all the parameters required by P.L. 109-58 to be taken into consideration before moving ahead with any acquisition strategy. DOE rejected tying decisions to acquire oil to any specific, measurable differentials in current and historic oil prices.

In the summer of 2007, DOE resumed RIK fill of the SPR. On May 19, 2008, with gasoline prices exceeding, on average, \$3.60 gallon, and approaching \$4.00/gallon in some regions, Congress passed P.L. 110-232. However, a few days earlier, on May 16, DOE announced it would not accept bids for an additional 13 million barrels of RIK oil that had been intended for delivery during the second half of 2008.

Through FY2007, royalty-in-kind deliveries to the SPR totaled roughly 140 million barrels and forgone receipts to the Department of the Interior an estimated \$4.6 billion. DOE had estimated deliveries of 19.1 million barrels of RIK oil during FY2008 and \$1.170 billion in forgone revenues.¹⁰

Opponents of RIK fill in the 110th Congress were not necessarily opposed to the concept of an SPR. When the price of crude was much less of an issue, objections to RIK fill were also ideological. Opponents of RIK fill in principle contended that a government-owned strategic stock of petroleum was inappropriate under any circumstance—that it essentially saddled the public sector with the expense of acquiring and holding stocks, the cost for which might have otherwise been borne by the private sector. The existence of the SPR, this argument goes, has blunted the level of stocks held in the private sector.¹¹ As already noted, RIK fill resumed in 2009 and ended in early 2010, pending establishment of additional storage. A site in Richton, MS, has been evaluated as a possible site for expansion of the SPR. However, while \$25 million for expansion activities was included in the FY2010 budget, it is not apparent that expansion is a high priority.

Royalty-in-Kind Termination

As already noted, legislation (P.L. 110-232) enacted in May 2008 forbade DOE from initiating any new activities to acquire royalty-in-kind (RIK) oil for the SPR during the balance of 2008. The sharp decline in crude oil prices since spiking to \$147/barrel in the summer of 2008 had spurred interest in resuming fill of the SPR. On January 2, 2009, the Bush Administration announced plans to purchase oil for the SPR, and to reschedule deferred deliveries. There were

¹⁰ Owing to suspension of RIK fill after the passage of legislation in May 2008, these figures will be significantly lower. Annual figures for RIK deliveries through FY2006 may be found in the Strategic Petroleum Reserve Annual Report for FY2006, p. 39: http://www.fossil.energy.gov/programs/reserves/publications/Pubs-SPR/spr_annual_rpt_06.pdf. Estimates for FY2008 furnished in a communication from DOE.

¹¹ See, for example, Taylor, Jerry and Van Doren, Peter, “The Case Against the Strategic Petroleum Reserve,” *Policy Analysis*, No. 555, November 21, 2005.

four components in the resumption of fill: (1) a purchase announced on January 16, 2009, of nearly 10.7 million barrels to replace oil that was sold after Hurricanes Katrina and Rita in 2005; (2) the return of roughly 5.4 million barrels of oil borrowed by refiners after Hurricane Gustav in 2008; (3) delivery of roughly 2.2 million barrels of RIK oil that had been deferred; and (4) resumption of RIK fill in May 2009 at a volume of 26,000 barrels per day, totaling over 6.1 million barrels to be delivered over a period from May 2009 to January 2010. These activities were intended to fill the SPR to its current capacity of 727 million barrels by early 2010. The government has not acquired oil for the SPR by outright purchase since 1994, when oil purchases ended. The SPR then held 592 million barrels.

On September 16, 2009, Secretary of the Interior Ken Salazar announced a transitional phasing out of the RIK Program.¹² As RIK oil and natural gas sales contracts expire, the oil and natural gas properties will revert to in-value status. As a result of the decision, an expansion of the SPR would require purchasing oil through the market at prevailing prices.

The Northeast Home Heating Oil Reserve

The Northeast Home Heating Oil Reserve (NHOR) was established after a number of factors contributed to the virtual doubling in some Northeastern locales of home heating oil prices during the winter of 1999-2000. Drawing particular attention of lawmakers was the sharply lower level of middle distillate stocks—from which both home heating oil and diesel fuels are produced—immediately beforehand. EPCA includes authority for the Secretary of Energy to establish regional reserves as part of the broader Strategic Petroleum Reserve. With support from the Clinton Administration, Congress moved to specifically authorize and fund a regional heating oil reserve in the Northeast. The FY2001 Interior Appropriations Act (P.L. 106-291) provided \$8 million for the Northeast Home Heating Oil Reserve (NHOR). The regional reserve was filled by the middle of October 2000 at two sites in New Haven, CT, and terminals in Woodbridge, NJ, and Providence, RI. The NHOR is intended to provide roughly 10 days of Northeast home heating oil demand.

There was controversy over the language that would govern its use. Opponents of establishing a regional reserve suspected that it might be tapped at times that some consider inappropriate, and that the potential availability of the reserve could be a disincentive for the private sector to maintain inventories as aggressively as it would if there were no reserve. The approach enacted predicated drawdown on a regional supply shortage of “significant scope and duration,” or if—for seven consecutive days—the price differential between crude oil and home heating oil increased by more than 60% over its five-year rolling average. The intention was to make the threshold for use of the regional reserve high enough so that it would not discourage oil marketers and distributors from stockbuilding. The President could also authorize a release of the NHOR in the event that a “circumstance exists (other than the defined dislocation) that is a regional supply shortage of significant scope and duration,” the adverse impacts of which would be “significantly” reduced by use of the NHOR.

During mid- and late December 2000, the 60% differential was breached. However, this was due to a sharp decline in crude prices rather than to a rise in home heating oil prices. In fact, home

¹² Bureau of Ocean Management, Regulation and Enforcement. <http://www.mrm.boemre.gov/AssetManagement/default.htm>

heating oil prices were drifting slightly lower during the same reporting period. As a consequence, while the 60% differential was satisfied, other conditions prerequisite to authorizing a drawdown of the NHOR were not.

A general strike in Venezuela that began in late 2002 resulted, for a time, in a loss of as much as 1.5 million barrels of daily crude supply to the United States. With refinery use lower than usual owing to less crude reaching the United States, domestic markets for home heating oil had to rely on refined product inventories to meet demand during a particularly cold winter. Prices rose, and there were calls for use of the NHOR; still, the price of heating oil fell significantly short of meeting the guidelines for a drawdown.¹³

In the 111th Congress, S. 283, introduced on January 21, 2009, would have permitted drawdown on the basis of price as well as supply. The bill would have mandated a release of 20% of the heating oil held in the Reserve if the average retail price for home heating oil in the Northeast exceeded \$4.00 per gallon on November 1 of the fiscal year. An additional 20% would be released in four additional installments if the average retail price exceeded \$4.00/gallon on the first of each month, December through March. S. 283 was the subject of a May 12, 2009 hearing before the Senate Committee on Energy and Natural Resources (S. Hrg. 111-67).

SPR Expansion

The Energy Policy Act of 2005 (EPAAct) requires, “as expeditiously as practicable,” expansion of the SPR to its authorized maximum physical capacity of 1 billion barrels. 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. The FY2010 SPR budget, at \$229 million, included \$43.5 million for purchase of a cavern at Bayou Choctaw to replace a cavern posing environmental risks, as well as \$25 million for expansion activities. However, it is not apparent that expansion remains a high priority.

Bayou Choctaw

Bayou Choctaw has six storage caverns with a total capacity of 76 million barrels. One cavern, Bayou Choctaw Cavern 20, is within 60 ft of the edge of the salt dome and must be replaced for fear of breaching the salt dome with further use.¹⁴ The SPR oil stored at the Bayou Choctaw site is not in any immediate danger of leaking, however. Cavern 20 has passed all integrity tests. To limit any risk, DOE has reduced the oil stored in Cavern 20 from 7.5 million barrels to 3.2 million barrels by using only the upper portion of the cavern.

DOE has temporarily stored the remaining oil in Big Hill and West Hackberry caverns in the brine cushion at the bottom of the cavern, which will eventually be needed to accommodate cavern creep (geological shrinkage). DOE is currently acquiring a 10-million-barrel replacement cavern in the Bayou Choctaw salt dome. The replacement cavern would be available for oil

¹³ During the heating oil season, DOE updates and posts a weekly table that shows the various inputs that go into the calculation to determine the current differential, http://www.fe.doe.gov/programs/reserves/heatingoil/Sales_Basis_0506.html.

¹⁴ Personal communication with David Johnson, DOE Deputy Assistant Secretary for Petroleum Reserves, March 7, 2011.

storage in December 2012 and would provide capacity for the 3.2 million barrels in Cavern 20 and the 4.3 million barrels temporarily stored at Big Hill and West Hackberry, plus provide an additional 2.5 million barrels of spare capacity. Cavern 20 is to be emptied and abandoned.¹⁵

Richton Dome

The Energy Policy Act of 2005 (EPAct) required SPR expansion to its maximum authorized capacity of 1 billion barrels. DOE has evaluated a site in Richton, MS, as a possible location for an additional 160 million barrels of capacity. However, in its FY2011 request, the Obama Administration proposed to suspend spending in support of SPR expansion. The budget request proposed to redirect \$71 million previously appropriated for expansion to “partially fund SPR non-expansion operations and maintenance activities.” The Administration cited an Energy Information Administration 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.” The Administration reduced the FY2011 request for the SPR to \$138.9 million, a sharp reduction from the \$243.8 million appropriated for FY2010. The FY2012 SPR funding request is reduced further, to \$121.7 million.

The Debate Over When the SPR Should Be Used

Historically, the use of the SPR has been tied to a physical shortage of supply—which normally will manifest itself, in part, in an increase in price. However, price was deliberately kept out of the President’s SPR drawdown authority because of concerns about what price level would trigger a drawdown, and that any hint of a price threshold could influence private sector and industry inventory practices.

As has been noted, the original intention of the SPR was to create a reserve of crude oil stocks that could be tapped in the event of an interruption in crude supply. Debate over releasing SPR oil traces differences in opinion over just what constitutes a “severe energy supply interruption.” The debate during the 1980s over when, and for what purpose, to initiate an SPR drawdown reflected the significant shifts that were taking place in the operation of oil markets after the experiences of the 1970s, and deregulation of oil price and supply. Sales of SPR oil authorized by the 104th Congress—and in committee in the 105th—renewed the debate for a time.¹⁶

The SPR Drawdown Plan, submitted by the Reagan Administration in 1982, provided for price-competitive sale of SPR oil. The plan rejected the idea of conditioning a decision to distribute SPR oil on any “trigger” or formula. To do so, the Administration argued, would discourage private sector initiatives for preparedness or investment in contingency inventories. Many analysts, in and out of Congress, agreed with the Administration that reliance upon the marketplace during the shortages of 1973 and 1979 would probably have been less disruptive than the price and allocation regulations that were imposed. But many argued that the SPR should be used to moderate the price effects that can be triggered by shortages like those of the 1970s or

¹⁵ On March 1, 2011, Senators Jack Reed and Sheldon Whitehouse urged President Obama to sell the oil from the Bayou Choctaw cavern rather than move it to new caverns as proposed by DOE.

¹⁶ These were sales ordered by Congress as deficit-reduction measures. For a chronology of these sales, see <http://www.fe.doe.gov/prs/reserves/spr/spr-drawdown.html>.

the tight inventories experienced **during the spring of 1996**, and lack of confidence in supply availability. Early drawdown of the SPR, some argued, was essential to achieve these objectives.

The Reagan Administration revised its position in January 1984, announcing that the SPR would be drawn upon early in a disruption. This new policy was hailed as a significant departure, considerably easing congressional discontent over the Administration's preparedness policy, but it also had international implications. Some analysts began to stress the importance of coordinating stock drawdowns worldwide during an emergency lest stocks drawn down by one nation merely transfer into the stocks of another and defeat the price-stabilizing objectives of a stock drawdown. In July 1984, responding to pressure from the United States, the International Energy Agency agreed "in principle" to an early drawdown, reserving decisions on "timing, magnitude, rate and duration of an appropriate stockdraw" until a specific situation needed to be addressed.

Use of the SPR in the Persian Gulf War (1990)

This debate was revisited in the aftermath of the Iraqi invasion of Kuwait on August 2, 1990. The escalation of gasoline prices and the prospect that there might be a worldwide crude shortfall approaching 4.5 million-5.0 million barrels daily prompted some to call for drawdown of the SPR. The debate focused on whether SPR oil should be used to moderate anticipated price increases, before oil supply problems had become physically evident.

In the days immediately following the Iraqi invasion of Kuwait, the George H. W. Bush Administration indicated that it would not draw down the SPR in the absence of a physical shortage simply to lower prices. On the other hand, some argued that a perceived shortage does as much and more immediate damage than a real one, and that flooding the market with stockpiled oil to calm markets is a desirable end in itself. From this perspective, the best opportunity to use the SPR during the first months of the crisis was squandered. It became clear during the fall of 1990 that in a decontrolled market, physical shortages are less likely to occur. **Instead, shortages are likely to be expressed in the form of higher prices, as purchasers are free to bid as high as they wish to secure scarce supply.**

Within hours of the first air strike against Iraq in January 1991, the White House announced that President Bush was authorizing a drawdown of the SPR, and the IEA activated the plan on January 17. Crude prices plummeted by nearly \$10/barrel in the next day's trading, falling below \$20/bbl for the first time since the original invasion. The price drop was attributed to optimistic reports about the allied forces' crippling of Iraqi air power and the diminished likelihood, despite the outbreak of war, of further jeopardy to world oil supply. The IEA plan and the SPR drawdown did not appear to be needed to help settle markets, and there was some criticism of it. Nonetheless, more than 30 million barrels of SPR oil was put out to bid, but DOE accepted bids deemed reasonable for 17.3 million barrels. The oil was sold and delivered in early 1991.

The Persian Gulf War was an important learning experience about ways in which the SPR might be deployed to maximize its usefulness in decontrolled markets. As previously noted, legislation enacted by the 101st Congress, P.L. 101-383, liberalized drawdown authority for the SPR to allow for its use to prevent minor or regional shortages from escalating into larger ones; **an example was the shortages on the West Coast and price jump** that followed the Alaskan oil spill of March 1989. In the 102nd Congress, omnibus energy legislation (H.R. 776, P.L. 102-486) broadened the drawdown authority further to include instances where a reduction in supply appeared sufficiently severe to bring about an increase in the price of petroleum likely to "cause a major adverse impact on the national economy." The original EPCA authorities permit "exchanges" of oil for the

purpose of acquiring additional oil for the SPR. Under an exchange, a company borrows SPR crude and later replaces it, including an additional quantity of oil as a premium for the loan. There were seven exchanges between 1996 and 2005. The most recent one (with the exception of a test exchange in the spring of 2008) was in June 2006. ConocoPhillips and Citgo borrowed 750,000 barrels of sour crude for two refineries affected by temporary closure of a ship channel.

A new dimension of SPR drawdown and sale was introduced by the Clinton Administration's proposal in its FY1996 budget to sell 7 million barrels to help finance the SPR program. While agreeing that a sale of slightly more than 1% of SPR oil was not about to cripple U.S. emergency preparedness, some in Congress vigorously opposed the idea, in part because it might establish a precedent that would bring about additional sales of SPR oil for purely budgetary reasons, as did indeed occur. There were three sales of SPR oil during FY1996. The first was to pay for the decommissioning of the Weeks Island site. The second was for the purpose of reducing the federal budget deficit, and the third was to offset FY1997 appropriations. The total quantity of SPR sold was 28.1 million barrels, and the revenues raised were \$544.7 million. Fill of the SPR with RIK oil was initiated in some measure to replace the volume of oil that had been sold during this period.

Hurricanes and Changes in the Market Dynamics (2005-2008)

Prior to Hurricanes Ivan, Katrina, and Rita in 2005, growth in oil demand had begun to strap U.S. refinery capacity. A result has been an altering in a once-observed historic correlation between crude oil and refined oil product prices. In the past, changes in the price of crude had driven changes in the cost of refined products. The assumption that product prices are driven by, and follow the path of, crude prices, was at the center of debates from the 1980s until early in the decade of 2000 whether an SPR drawdown was warranted when prices spiked.

However, beginning in the middle of the first decade of the new century, pressure on product supplies and the accompanying anxiety stoked by international tensions caused a divorce in that traditional correlation between crude and product prices. The increases in prices of gasoline and other petroleum products following Hurricanes Katrina and Rita, for example, were not a response to any shortage of crude oil, but to shortages of refined products owing to the shutdown of major refining capacity in the United States, and to an interruption of product transportation systems.

The rise in crude prices to over \$140/barrel by the summer of 2008 was attributable to many contributing factors, including increasing international demand, and concern that demand for crude might outstrip world production. Markets were described as "tight," meaning that there might be little cushion in terms of spare production capacity to replace any crude lost to the market, or to provide adequate supply of petroleum products. In such a market, where demand seems to be brushing against the limits to meet that demand, refinery outages, whether routine or unexpected, can spur a spike in crude and product prices, as can weekly reports of U.S. crude and petroleum stocks, if the numbers reported are not consistent with expectations. As prices continued to increase during 2007-2008, some argued that market conditions did not support the high prices. One market analyst remarked at the end of October 2007, "The market at this stage totally ignores any bearish news [that would soften the price of oil], but it tends to exaggerate bullish news."¹⁷ Significant and sustained increases in oil prices were observed in the absence of

¹⁷ Oil Daily, October 30, 2007. *Crude Continues Its Rally as Storm Hits Mexican Crude Exports*: p. 3.

the sort of “severe energy supply interruption” that remains the basis for use of the SPR. Legislation in the 111th Congress (S. 1462) would have established a price basis for authorizing a drawdown of the SPR. However, a release from the SPR might not lower prices under every scenario.

Summer 2008 Call for an SPR Drawdown

Some policymakers had urged the George W. Bush Administration to release oil from the SPR during the crude oil price run-up of spring and summer 2008. A review of the dynamics in the oil market during this period provides a demonstration of why an SPR release in the face of high prices will not necessarily foster a decline in petroleum prices.

By mid-July 2008, U.S. gasoline prices were exceeding \$4.00/gallon and diesel fuel was averaging \$4.75/gallon. Crude oil prices had briefly exceeded more than \$145/barrel, but declined late in the month to less than \$128/barrel. Oil prices had risen in recent years in the absence of the normal association with the concept of “disruption” or “shortage.” The escalation in prices to their observed peak in July 2008 was driven by several factors that are difficult to weigh. Chief among them was the existence of little or no spare oil production capacity worldwide, and a general inelasticity in demand for oil products despite high prices. Prices also generally prove sensitive to the ebb and flow of international tensions, the value of the U.S. dollar, and even the appearance of storms that could develop into hurricanes that might make landfall in the Gulf of Mexico.

Political Unrest in the Middle East and North Africa (MENA) 2011

The political unrest that began in Tunisia and spread to Egypt and Libya in early 2011 has been tied to the surge in oil prices observed during the 1st quarter of the year. To calm markets and to moderate prices, some have called for releasing oil from the SPR.

By early March 2011, the price of West Texas Intermediate (WTI), trading on the New York Mercantile Exchange (NYMEX) for April delivery, was in excess of \$100 per barrel. In Europe, the price of Brent crude oil exceeded \$115 per barrel. These prices, approximately 20% higher than before the outbreak of political unrest, reflect at least two important factors: first, expectations that the unrest could spread to other countries, some of which could be major oil producers, and second, that actual Libyan exports have been curtailed, to an uncertain extent, but likely by at least one half. As an offset to the lost Libyan crude exports, Saudi Arabia has indicated that it will expand its exports to keep the world market supplied.

If oil were released from the SPR, the key questions would be whether such a release could dampen expectations that are driving the market, and whether it would reduce prices in the short run, and where.

The world is not currently experiencing a shortage of crude oil. Demand remains moderated by the recession, although it is recovering. On the supply side, Saudi Arabia, it is believed, has expanded production to replace the Libyan shortfall. However, a shortage does exist in the sense that Libyan exports of light, sweet crude oil, favored by European refiners to produce clean diesel fuel, have fallen. It is not likely that heavier, sour crude oil produced by Saudi Arabia is a perfect substitute for lost Libyan supplies. As a result, European prices of crude oil have risen more than U.S. prices. If the United States drew light, sweet crude oil from the SPR in sufficient volume, it

is possible that competition between U.S. and European refiners for available oil supplies could moderate competing demands and have some effect on price. Since prices in Europe rose the most due to unrest in the MENA, it is likely that any moderating in price due to a release of light, sweet crude from the SPR would occur in the European market with only a smaller effect in the United States. It is not known what volume of SPR draw would be required for any specified price reduction, and it is worth noting that of the 727 million barrels in the SPR, less than half, about 293 million barrels, is light, sweet crude.

If political unrest does spread to additional major oil exporting countries, for example Kuwait or Saudi Arabia, it is likely that a major increase in the world price of oil, based on deteriorating expectations, would occur. In that case, additional available oil on the market from reserve stocks would likely have little effect on futures markets, as price movements in those markets reflect availability of supply into the future, not current market conditions. Rather than more currently available oil, the futures markets would require a belief that more future oil production capacity was likely to become available.

Other Policy Considerations

Over the last 25 years, the °API gravity of imported crude oils has been decreasing, while average sulfur content has been increasing. °API gravity, a measure developed by the American Petroleum Institute, expresses the “lightness” or “heaviness” of crude oils on an inverted scale.¹⁸ With a diminishing supply of light, sweet (low sulfur) crude oil, U.S. refineries have had to invest in multi-billion dollar processing-upgrades to convert lower-priced heavier, sour crude oils to high-value products such as gasoline, diesel, and jet fuel.

Currently, 124 U.S. refineries process crude oil into fuel (this includes three refinery complexes that are each made up of two formerly independent refineries).¹⁹ The number is down from the 158 reportedly operating a decade ago. Although the number of refineries has decreased, operable refining capacity has increased over the past decade from 16.5 million barrels/day (bpd) to over 18 million barrels per day. Most of the country’s gasoline is refined in the Gulf Coast region (Petroleum Administration for Defense District 3), which makes up nearly 45% of the U.S. refining capacity through 45 refineries processing more than 8 million barrels per day. These refineries also represent some of the largest and most complex refineries in the United States, if not the world.

In the months prior to Hurricanes Gustav and Ike, there were some calls for an SPR drawdown despite the absence of any discernible shortage. On July 24, 2008, legislation (H.R. 6578; 110th Congress) to require a 10% drawdown of SPR oil failed to achieve a two-thirds majority in the House under suspension of the rules (226-190). The language was included in H.R. 6899 (110th Congress), the Comprehensive American Energy Security and Consumer Protection Act, which passed the House on September 16th (236-189). The bill would have required a sale of 70 million barrels of light grade petroleum from the SPR within six months following enactment. The bill stipulated that 20 million barrels must be offered for sale during the first 60 days. All oil from the

¹⁸ CRS Report R41478, *The U.S. Oil Refining Industry: Background in Changing Markets and Fuel Policies*, by Anthony Andrews, Robert Pirog, and Molly F. Sherlock.

¹⁹ CRS Report R41478, *The U.S. Oil Refining Industry: Background in Changing Markets and Fuel Policies*, by Anthony Andrews, Robert Pirog, and Molly F. Sherlock.

sale would be replaced with “sour” crude to be acquired after the six-month sale period, with the replacement acquisition completed not later than five years after enactment.

The genesis of the H.R. 6899 proposal lay partly in an analysis by the Government Accountability Office (GAO), which observed that the proportion of grades of oil in the SPR was not as compatible as it could be with the trend of refineries toward being able to handle heavier grades of crudes.²⁰ GAO observed that 40% of the crude oil refined by U.S. refineries was heavier than that stored in the SPR. Refiners reported to GAO that running lighter crude in units designed to handle heavy crudes could impose as much as an 11% penalty in gasoline production and 35% in diesel production. The agency reported that other refiners indicated that they might have to shut down some of their units.²¹ Refineries that process heavy oil cannot operate at normal capacity if they run lighter oils. The types of oil currently stored in the SPR would not be fully compatible with 36 of the 74 refineries considered vulnerable to supply disruptions. (A majority of the refineries that have pipeline access to the SPR are located in the Gulf Coast region and the Midwest region.) GAO cited a DOE estimate that U.S. refining throughput would decrease by 735,000 barrels per day (or 5%) if the 36 refineries had to use SPR oil—a substantial reduction in the SPR’s effectiveness during an oil disruption, especially if the disruption involved heavy oil.

It was unclear what sort of effect a roughly 70 million barrel draw on the SPR would have on prices. In a market where there is no physical shortage, oil companies may have limited interest in SPR oil unless they have spare refining capacity to turn the crude into useful products, or want to build crude oil stocks.²² SPR oil is not sold at below-market prices. Bids on SPR oil are accepted only if the bids are deemed fair to the U.S. government. If the announcement itself that the SPR is going to be tapped 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 was impossible to predict what effect an SPR drawdown would have had on oil prices at any time in 2008, given the many other factors that bear on daily oil prices.

There are additional considerations. A unilateral draw on U.S. stocks would probably have less impact on the world oil market than a coordinated international drawdown of the sort that occurred after Hurricanes Katrina and Rita in 2005. Some might argue that it would be unwise under any scenario for the United States to draw down its strategic stocks while other nations continue to hold theirs at current levels. Additionally, it is always possible that producing nations might reduce production to offset any SPR oil delivered into the market. In the setting of 2008, producing, exporting nations could have argued that the market was already well-supplied and that short-term supply concerns were not what was keeping prices relatively high.

The SPR has been perceived as a defensive policy tool against high oil prices, but if it is used without a discernible impact on oil prices, it is possible that the SPR will lose some of whatever psychological leverage it exercises on prices when left as an untapped option.

²⁰ U.S. Government Accountability Office, *Strategic Petroleum Reserve - Options to Improve the Cost-Effectiveness of Filling the Reserve*, GAO-08-512T, February 26, 2008, p. 5, <http://www.gao.gov/new.items/d08521t.pdf>.

²¹ See Government Accountability Office. *Options for Improving the Cost-Effectiveness of Filling the Reserve*. February 2008. GAO-08-521T, <http://www.gao.gov/new.items/d08521t.pdf>. An additional benefit to acquiring heavier grades of crude is that it is less expensive.

²² Use of refining capacity has been running at generally observed averages, taking into account seasonal maintenance and other events that will take refinery units offline temporarily. See Table 2 at http://www.eia.doe.gov/oil_gas/petroleum/data_publications/weekly_petroleum_status_report/wpsr.html.

Legislation in the 111th Congress

The Omnibus Appropriations Acts of 2009 (P.L. 111-8) provided \$205 million for necessary expenses for Strategic Petroleum Reserve facility development and operations and program management activities, of which \$31.5 million was provided to initiate new site expansion activities, beyond land acquisition. The Northeast Home Heating Oil Reserve received \$9.8 million for necessary operation and management expenses.

The Supplemental Appropriations Act for 2009 (P.L. 111-32) authorized a transfer of \$21.6 million from the SPR petroleum account for site maintenance activities.

The Energy and Water Appropriations Act for 2010 (P.L. 111-85) provided \$243.8 million for development and operations and program management activities at the Strategic Petroleum Reserve facility, and \$11.3 million for the Northeast Home Heating Oil Reserve. Section 313 of the Appropriations Act prohibited expending SPR appropriations to anyone engaged in selling refined products valued at more than \$1 million to Iran or contributing in any way to expansion of refining capacity in Iran. Firms providing, or insuring tankers carrying, refined product to Iran were also included in the prohibition.

Proposals in the 112th Congress

A bill to establish a National Strategic Gasoline Reserve (H.R. 142) would authorize the Secretary of Energy to set aside 10 million barrels of refined gasoline products similar to the Northeast Home Heating Oil Reserve.

Arguments in favor of establishing a refined product reserve are that U.S. oil imports include refined products and that it could be more efficient and calming to markets if it were not necessary to first draw down SPR crude and then refine it into needed products. The effect that SPR crude might have on moderating price increases could also be offset if refineries themselves or oil pipelines carrying crude to refineries were compromised. The availability of refined product reserves would address that scenario. Having a regional product reserve would also lessen the likelihood that delivery of crude or product from the stocks of IEA signatories might overwhelm U.S. port facilities; this happened in the wake of the European response that followed Hurricanes Rita and Katrina.

Arguments against a product reserve include the prospect that the availability of supplemental supplies of gasoline from abroad may increase as European demand for diesel vehicles displaces gasoline consumption there. Additionally, storage of refined product is more expensive than for crude. Storage of crude in salt caverns is estimated to cost roughly \$3.50/barrel while above-ground storage of product in tanks might cost \$15-\$18/barrel. Refined product will also deteriorate and would need to be periodically sold and replaced to assure the quality of the product held in the product reserve. Many states also use different gasoline blends, adding to the complexity of identifying which blends should be stored where, and in what volume. It would be simpler to hold conventional gasoline in a product reserve with the expectation that the

Environmental Protection Agency (EPA) would waive Clean Air Act (CAA) requirements during an emergency.²³

H.R. 1017, introduced March 10, 2011, would provide for the sale of light grade petroleum from the Strategic Petroleum Reserve and replace the crude with refined petroleum product.

Author Contact Information

Anthony Andrews
Specialist in Energy and Defense Policy
aandrews@crs.loc.gov, 7-6843

Robert Pirog
Specialist in Energy Economics
rpirog@crs.loc.gov, 7-6847

Acknowledgments

This report updates an earlier report, CRS Report RL33341, *The Strategic Petroleum Reserve: History, Perspectives, and Issues*, authored by Robert Bamberger.

²³ See testimony of Rusco, Frank. Director, Natural Resources and Environment, Government Accountability Office, appearing in U.S. Congress. Committee on Energy and Natural Resources. Strategic Petroleum Reserve. S.Hrg. 111-67. May 9, 2009, p. 8-17.