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The Strategic Petroleum Reserve and Hurricanes: A Primer

Often used in response to major hurricanes, the SPR remains a strategic asset to protect against disruption in US crude oil supplies.

In response to the devastation caused by Hurricane Harvey, US Department of Energy (DOE) Secretary Rick Perry authorized the release of several million barrels of crude oil from the nation's Strategic Petroleum Reserve (SPR). Releases were made first to Phillips 66 for its refinery in Lake Charles, Louisiana, and shortly thereafter to Marathon and Valero. These releases were to make up for the reduction in available crude oil supplies immediately following the storm, which temporarily reduced crude production by nearly 15%, and oil refining operations by well over 20%, in the affected area.

Use of the SPR following catastrophic storms has become somewhat common over recent decades, and seems likely to continue into the future, possibly within the near term depending on the paths of additional storms this hurricane season. This *White Paper* provides a brief description and history of the SPR, and then explains the legal bases and economic consequences of different types of releases from it.

Background

The SPR consists of four facilities located in close proximity to one another and near production, transport, and refining infrastructure along the Louisiana and Texas Gulf Coasts. Maintained and operated by DOE, the crude oil is stored in underground salt caverns — providing relatively easy and inexpensive storage given the volume. The SPR holds over 713 million barrels of oil if filled to capacity, though at present it houses some 678 million barrels. To put that in perspective, the daily oil consumption of the entire world constitutes some 93 million barrels, and therefore the SPR could — as a thought experiment to illustrate — meet the world's demand for about a week were no other sources of crude oil available. Demand for oil in the US well exceeds 15 million barrels a day (MBD),[1] which is to say the SPR could meet the nation's oil needs for about a month and a half if no other source were available. The SPR's capacity to meet demand is subject, however, to important practical constraints associated with moving the crude physically out of the SPR and delivering it to markets.

The SPR was created in the late 1970s, authorized as part of the Energy Policy and Conservation Act of 1975 (EPCA) in response to the Arab Oil Embargo of 1973-74. The SPR's basic purpose was to stockpile crude oil in preparation for events that might significantly curtail oil supplies to the US — in that sense was the reserve "strategic" — an effort to make the country more energy-independent. The SPR's creation showed the world that the US would be more self-reliant with respect to oil.

Domestic Oil Production

Circumstances have changed. Whereas policymakers perceived the US to be somewhat vulnerable to the export policies of oil-producing countries in the 1970s, that vulnerability has since receded substantially. While the US still consumes more oil than it produces domestically, the US buys crude from a number of producers, and the oil-producing countries that in the 1970s showed great coordination across their production policies (and thus export policies) have in recent years been less able or less willing to withhold supplies. What is more, the US has meanwhile increased domestic oil production, as a result of improved drilling techniques and other technological advances allowing for the production of previously unrecoverable oil ("tight oil"), together with discoveries or greater estimates of recoverable oil resources in North America.

Thus, for example, from 2010 to 2016 domestic oil production increased dramatically, from fewer than 6 MBD to about 9 MBD.[2] Domestic production is, of course, a function of global prices, and thus production (*i.e.*, investments in production) fell as oil prices fell in very recent years. Even so, US production not only has increased substantially overall in the past decade — with tight oil production surpassing non-tight oil production in 2015 — but is now forecast to reach an all-time high of 9.9 MBD in 2018, eclipsing the historical high of 9.6 MBD during the boom of 1970.[3]

Meanwhile, the US has increased exports of crude oil as well as exports of refined petroleum products, another indication of the strength of domestic supplies. In fact, such exports have doubled since 2010,[4] due in substantial part to the end of the crude oil export ban in December 2015. In short, the scenario in which the US might suddenly find itself vulnerable to the policies of a few oil-producing countries is much less likely than it was when the SPR was created.

Reliance on the SPR over the past several decades supports the same conclusion: the SPR has been used a number of times, but never in response to an oil embargo against the US, or even in response to substantially curtailed production from countries that sell crude to the US with the intent to harm US supplies. Instead, the SPR has been used mostly in response to major hurricanes and certain other adversities, as explained below.

Legal Requisites for Releasing Oil

The statute creating the SPR allows for releases in several circumstances. First, oil from the SPR may be released for sale (known as a "drawdown and sale") if the President concludes that a release is required "by a severe energy supply interruption" *or* because the United States is internationally obligated to supply oil pursuant to "the international energy program."[5] To explain the latter, the United States promised, through the Agreement on an International Energy Program, to participate in "collective actions" by the International Energy Agency to increase global supplies in times of crisis. (The US has done so on three occasions, in 1991, 2005, and 2011.) In the domestic context, a severe energy supply interruption means — and requires the President to find — that an emergency resulted in a reduction in crude supplies of significant scope and duration leading to a "severe increase" in the price of petroleum products that is likely to have "a major adverse impact on the national economy."[6] Sales from such drawdowns, which of course have the effect of increasing market supplies, must under EPCA be made to the highest qualified bidder at a competitive public auction.

Use of this presidential authority has been spare. A presidential drawdown and sale has occurred twice in the SPR's history. The first was during the Persian Gulf War in 1991, when President Bush (together with other countries) ordered sales towards stabilizing world oil markets during military operations that were disruptive to Middle East countries. The second followed Hurricane Katrina in 2005, when the President authorized a release of 11 million barrels of crude oil.

In addition to a sale authorized by the President in response to a severe energy supply interruption, EPCA alternatively authorizes a drawdown and sale if the President finds that circumstances — short of a severe energy supply interruption — constitute or are "likely to" constitute a "domestic or international energy supply shortage," and if a release would "assist directly and significantly in preventing or reducing the adverse impact" of the supply shortage.[7] In other words, the alternative circumstances authorizing a presidential release are somewhat less dire, as the President need not determine that a severe price increase will likely have a major adverse and national economic impact. Moreover, this type of release can be done as a preventive measure ("preventing or reducing" an adverse impact).[8] Interestingly, these alternative grounds for a drawdown and sale have never been used.[9]

Separately, EPCA also authorizes the Secretary of Energy to release oil from the SPR without any presidential determination.[10] But whereas oil can be sold upon the requisite findings by the President, the Secretary's authority to release oil is limited to releases for the purpose of increasing the amount of crude oil in the SPR. Yes, *increasing*. That is to say, the Secretary may authorize an exchange or swap of oil in the SPR in the present, for a promise to repay the SPR in the future with an equal amount of oil of comparable grade plus some premium of additional oil. This is part of the Secretary's general authority to acquire crude for the SPR. Following a perfection of a swap, the total volume in the SPR is increased. But in the interim, before in-kind-plus repayment is made, a swap has the effect of increasing market supplies.

Finally, sales and exchanges can be made for other purposes as well, such as for "testing" both the SPR's operational capacity and market response to a release.[11] For another example, Congress required a sale of 6.4 million barrels as part of the Bipartisan Budget Act of 2015. Releases have also been made in response to shipping accidents that impeded maritime traffic and in turn threatened short-term supplies to domestic refineries. Such occasions usually involve smaller releases, in the hundreds of thousands rather than millions of barrels of crude.

The Effects of SPR Releases

Whether oil supplies can be increased in the short term through an exchange depends on whether companies would make the trade, which is to say whether short-term or longer-term oil prices are higher. When the current price of crude exceeds the future price, known as market "backwardation," market participants have an incentive to take oil in the present (at a higher price) in exchange for a commitment to return oil to the SPR later (at a then-lower price). When oil futures are, instead, higher than spot prices — for example, when storage or "carrying costs" or other market factors yield futures prices that exceed current prices — there will be little or no incentive to accept relatively cheap oil today in exchange for relatively expensive oil later.[12]

In times of crisis — such as destructive hurricanes when supplies fall suddenly and significantly while demand remains high — current prices may well exceed future prices. And indeed, a secretarial exchange was the basis of the 4.5 million barrels released into the market very recently following Hurricane Harvey. In fact, most SPR releases also have been acquisitive releases, including those made following Hurricane Lili (2002; 1 million barrels); Hurricane Ivan (2004; 5.4 million); Hurricane Katrina (2005; 10 million in exchanges, in addition to the 11 million barrels by presidential sale and release); Hurricanes Gustav and Ike (2008; 5.4 million total); and Hurricane Isaac (2012; 1 million).[13]

As releases by DOE are eventually repaid in kind, they do not result in a permanent increase in oil supplies. Because a *permanent* increase in oil supplies is not usually needed in response to the disruption of a catastrophic storm (given the overall robustness of domestic production infrastructure, global production capacities, and a stable global market), a swap increasing supplies in the near term will

likely address domestic market needs. In addition to boosting supplies in the short run, an exchange furthermore provides an important stabilizing signal to relevant markets — that crude can be made available as necessary to meet urgent demand.

Releases by the Secretary of Energy to acquire oil are not subject to statutory time limits, which is to say that the temporary increase in oil supplies — that is, until repayment in kind is due — can be calibrated according to needs and circumstances. Unlike drawdowns and competitive sales done under presidential authority, DOE releases can be negotiated bilaterally and in short order with the contracting entities that may have the greatest short-term need, though they may be made on a competitive basis as well. DOE exchanges also can be initiated at the request of an oil company. Such advantages of secretarial exchanges account for why most releases from the SPR have been done by swaps, including those following Hurricane Harvey.

Conclusion

A strategic oil reserve originally intended as protection against changes in foreign crude oil supplies has, over the course of the intervening decades, been used more frequently to respond to storms bringing catastrophic damage. Short supplies of crude oil inevitably lead to short supplies of refined petroleum products. The SPR has been used to cover immediate needs for crude oil and to signal markets that resources are available to cover urgent demand. There is every reason to expect that acquisitive exchanges will continue be made in response to major hurricanes or possibly other major weather events in the future.

Yet, the fact that the SPR has been used most frequently in response to hurricanes should not be misunderstood to demonstrate that hurricane response is the SPR's only or even primary purpose. To the contrary, the SPR continues to serve conventionally strategic purposes as well. Such a quantity of available crude oil, in excess of what is required for major hurricanes, remains important to national security for use in times of war or other conflict, as it was in 1991 in the Persian Gulf War. In addition, the SPR discourages those who might attempt to reduce supplies to the US, by demonstrating the impracticality of limiting the nation's resources. Reserves of crude oil ensure that the US can compensate for any kind of world event — hostile or meteorological — that may affect crude oil supplies.

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Endnotes

1 The Energy Information Administration estimates total US consumption to be some 19 MBD, taking total product supplied as a proxy for consumption, though that total figure includes biofuels as well.

2 Energy Information Administration, Annual Energy Outlook (2017).

3 Energy Information Administration, Short Term Energy Outlook (2017).

4 Energy Information Administration, Data Tables, "Petroleum & Other Liquids," available at https://www.eia.gov.

5 Energy Policy and Conservation Act, § 161(d).

6 *Id.*

7 *Id.* at § 161(h).

8 The statute also requires, in this scenario, that the Secretary of Defense find that a release will not impair national security, which is to say that there is ample volume in the SPR to release crude for a supply shortage that does not rise to a severe interruption.

9 EPCA also separately authorizes the President to release oil from the SPR, following either a severe energy supply interruption or an energy supply shortage, for the purposes of exchanging it for refined petroleum products (such as gasoline and diesel in

particular) provided from outside the United States (rather than for sale). Section 161(i). This authority has never been used either. In fact, while the SPR could legally maintain refined petroleum products and not only crude oil, the overall refining capacity of the United States is considered sufficient such that the SPR is used today for crude to be refined, not for refined products. DOE maintains separate and much smaller facilities that store one million barrels of heating oil and gasoline, at the Northeast Home Heating Oil Reserve and the Northeast Gasoline Supply Reserve respectively, in geographic locations where those products may be needed in an emergency.

10 Energy Policy and Conservation Act §§ 159-60.

11 *See, e.g., id.* at § 161(g).

12 "Little or no" because if carrying costs are high and futures prices exceed current prices by a small amount, there may be some incentive to swap. If futures prices greatly exceed spot prices, there will be no incentive for producers to swap with DOE.

13 See generally U.S. Department of Energy, Office of Fossil Energy, Strategic Petroleum Reserve, "History of SPR Releases" available at https://energy.gov.fe/services/petroleum-reserves/strategic-petroleum-reserve.