OFFICE OF INSPECTOR GENERAL

U.S. Department of Energy

# AUDIT REPORT

DOE-OIG-20-43

June 2020

## THE STRATEGIC PETROLEUM RESERVE'S MODERNIZATION PROGRAM

**Department of Energy**
Washington, DC 20585

June 1, 2020

MEMORANDUM FOR THE SECRETARY

FROM: Teri L. Donaldson
Inspector General

SUBJECT: INFORMATION: Audit Report on "The Strategic Petroleum Reserve's Modernization Program"

BACKGROUND

Since 1975, it has been the policy of the United States to maintain a strategic supply of federally owned petroleum products. Under the authority of the Secretary of Energy, the Strategic Petroleum Reserve (SPR) is intended to reduce the impact of petroleum supply disruptions, as well as fulfill the International Energy Program obligations of the United States. As of August 2019, SPR held approximately 645 million barrels of crude oil in a series of underground salt caverns along the Gulf Coast. The caverns are spread across four storage sites, two in Texas and two in Louisiana, and are connected to the Nation's commercial oil distribution network via major pipelines, as well as marine terminals. The Department of Energy's Office of Petroleum Reserves is responsible for the executive oversight of all aspects of the SPR program, and the SPR Project Management Office in New Orleans, Louisiana oversees the day-to-day operations of the storage sites.

In the Bipartisan Budget Act of 2015, Congress found that the age and condition of SPR had diminished its value as a Federal energy security asset. Meanwhile, global oil markets, as well as the location and amount of United States oil production, had dramatically changed in the 40 years since SPR was established. According to Congress, maximizing the energy security value of SPR requires a modernized infrastructure that meets the drawdown and distribution needs of these changed oil markets. To that end, Congress directed the Secretary of Energy to establish an SPR modernization program and authorized the Secretary to sell up to $2 billion worth of SPR oil to carry it out. Congress specified that the modernization program could include operational improvements to extend the useful life of SPR's infrastructure, but also new infrastructure and facilities to optimize SPR's drawdown and distribution capabilities. We initiated this audit to determine whether the Department's SPR modernization program was addressing the congressional findings in the Bipartisan Budget Act of 2015.

RESULTS OF AUDIT

We determined that the Department's SPR modernization program may not fully address the congressional findings in the Bipartisan Budget Act of 2015. In particular, while the Department's modernization plans address congressional concerns regarding the age and condition of SPR, the current plans may not ensure that the modernized SPR infrastructure would meet the drawdown and distribution needs of changed domestic and international oil markets. The Department originally scoped the modernization program to include two distinct projects, a life extension project to address SPR's aging infrastructure, and a distribution enhancements project to increase SPR's distribution capabilities. However, due to a lack of specific congressional funding authority, the Department decided to cancel the distribution enhancements project, leaving life extension as the only project in the SPR modernization program.

**Age and Condition of SPR**

The Department's modernization plans address congressional concerns regarding the age and condition of SPR. Specifically, the Department plans to extend SPR's key equipment and infrastructure capabilities for another 25 years via a project referred to as Life Extension – Phase II (LE2). The LE2 project work scope includes replacing and upgrading major components of SPR's drawdown and distribution infrastructure, such as pumps, motors, and piping, at each of SPR's four storage sites, as well as replacing some non-drawdown essential equipment related to cavern fill operations. Further, the Department plans to upgrade SPR's physical security systems as part of LE2. As of August 2019, the LE2 project team estimated that it could complete the project by February 2025 at a cost of $1.42 billion. While this latest estimate has not yet been validated, independent reviews by the Department's Office of Project Management Oversight and Assessments found that the project team's earlier LE2 project estimates were both comprehensive and credible.

However, there were some uncertainties still surrounding the project's scope. In particular, as of August 2019, the Department was still evaluating if, or how, the LE2 scope would change as a result of the unused storage capacity created by oil sales. Under current law, the Department is required to sell nearly 300 million barrels of oil between fiscal years 2017 and 2028. These sales could ultimately reduce SPR's crude oil inventory by more than 40 percent – from more than 695 million barrels held in 2015 to an estimated 400 million barrels by the start of fiscal year 2029. This would result in the lowest SPR inventory since 1983 and more than 300 million barrels of unused storage capacity. At the time of our audit, the Department was evaluating various LE2 project scope scenarios, including how the project's scope might change if the Department decided to close any of SPR's four storage sites. While removing a site from the LE2 scope could reduce costs between $150 million to $500 million, it could also impact SPR's drawdown and distribution capabilities. As of August 2019, the Department was still analyzing various scenarios but had not yet decided on any one option. In the meantime, the LE2 project scope assumed all four SPR storage sites would remain open and in the SPR configuration, albeit with significantly reduced inventories of oil.

## SPR's Posture amid Oil Market Changes

While the Department's LE2 project would address congressional concerns with SPR's physical components, the current modernization plans do not reflect the impact of changed global and domestic oil markets. Specifically, the LE2 project would extend the life of an infrastructure that was designed in 1975 under vastly different circumstances. SPR's 1970s-era goal was focused on avoiding national energy supply shortages, such as those that had occurred during the 1973-1974 oil embargo. However, international and domestic oil markets have dramatically changed since then. For instance, oil is now traded on a global market and, in 2018, United States crude oil production reached its highest point in American history, likely surpassing the production of both Russia and Saudi Arabia. Correspondingly, United States crude oil net imports were at an all-time low and had decreased every year – save for one – since peaking in 2005. The Energy Information Agency expects the trend to continue and projects that the United States could even become a crude oil net exporter by late 2020.

After analyzing these changes in its *Long-Term Strategic Review of the U.S. Strategic Petroleum Reserve* (Report to Congress, August 2016), the Department concluded that given today's global oil markets, which lack price controls to shield United States consumers from fluctuations in the global oil prices, the ability to add oil to global markets should be a key function of SPR during a market disruption. Further, the Department noted that in order to have a meaningful effect on supply, it is essential that SPR crude oil can be delivered into the market without displacing the domestically produced crude oil and Canadian imports that are already being transported in SPR's distribution network.

## Drawdown and Distribution Needs for Changed Oil Markets

While the Department acknowledged that changed oil markets impacted SPR's distribution capabilities, the current modernization plans do not address these limitations. In fact, the LE2 project would broaden the gap between the rate SPR can draw down oil from its caverns and the rate at which it can effectively distribute that oil to markets. According to a 2016 Departmental analysis of various distribution scenarios, SPR could only effectively distribute, at most, 2.56 million barrels per day, and potentially as little as 280 thousand barrels per day, depending on the scenario. The Department concluded that SPR needed an additional 2 million barrels per day of distribution capability to ensure that the United States could meet its international commitments.

Despite the distribution limitations, the Department did plan, however, to increase SPR's drawdown rate, the rate at which crude oil can be pumped out of storage caverns, by nearly 200 thousand barrels per day. Specifically, the Department plans to reestablish SPR's historical 4.415 million barrels per day drawdown rate, an increase from SPR's current drawdown capability of 4.22 million barrels per day. Yet, SPR's current drawdown capability already exceeds SPR's effective distribution capability by approximately 2 million barrels per day. As such, even though SPR may not be able to effectively distribute oil at the 4.22 million barrels per day rate that it is already capable of drawing down, the LE2 project would restore an even higher drawdown capability.

While no longer a part of the modernization efforts, the Department had initially included a second project, Marine Terminal Distribution Capability Enhancements (MTE), which was intended to expand SPR's distribution capabilities. The MTE project was supposed to add approximately 2 million barrels per day to SPR's distribution capability through the addition of two new dedicated marine terminals, associated pipelines, and facilities. However, the MTE project did not receive congressional funding authority in fiscal year 2018, and the Department subsequently terminated the project. According to the termination memorandum, while MTE was aligned with the priorities of the Department's previous Administration, the current Administration did not support it and had concerns with both the large upfront capital costs, as well as the lifecycle costs to staff, maintain, and operate Government-owned marine terminals.

Notwithstanding the cost-benefit analysis of the MTE project, the Department has not yet identified an alternative means of addressing SPR's distribution limitations, but, as discussed above, it still planned to restore a higher drawdown capability. If, as the Department found, SPR's effective distribution capability was, at most, 2.56 million barrels per day, SPR already has a high level of unutilized drawdown capability. Absent an initiative to expand SPR's distribution capabilities, increasing SPR's drawdown rate by another 200 thousand barrels per day may not be the most prudent use of the Department's modernization resources.

**Optimum SPR Configuration**

We believe these conditions occurred because the Department had not determined the optimum SPR configuration and capabilities for addressing these market changes. Although the Department had completed a strategic review of SPR in 2016, in support of our recommendations in a prior report, as well as a congressional directive, the review did not recommend any particular size for SPR, nor did the review identify the capabilities that would maximize SPR's energy security value.

## Optimum SPR Size and Capabilities

The Department had not determined SPR's optimum configuration and capabilities before proceeding with the modernization program, despite prior recommendations and congressional directives. Specifically, in July 2014, we recommended that the Department perform a strategic review of SPR to ensure that it was best configured to respond to the needs of the United States. We specified that this review should include an assessment of SPR's drawdown and distribution targets and capabilities. The next year, in its *Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure* (April 2015), the Department recommended an investment of up to $2 billion to optimize SPR's emergency response capability and stipulated that this investment should follow an analysis of the appropriate SPR size and configuration. Likewise, in the Bipartisan Budget Act of 2015, Congress echoed our recommendation regarding an SPR strategic review and further directed the Department to develop and submit to Congress a proposed action plan describing how the Department would achieve the optimal capacity, location, composition, storage, and distribution capabilities of SPR.

In response, the Department submitted its L*ong-Term Strategic Review of the U.S. Strategic Petroleum Reserve* (Report to Congress, August 2016). However, the review fell short of

identifying the optimum configuration and capabilities for SPR. In particular, the Strategic Review evaluated various SPR size options and distribution scenarios, but did not recommend any particular size or configuration for SPR. Rather, the review advised that a fuller analysis of the costs and benefits would be required to determine the appropriateness of any inventory reductions beyond the estimated 124 million barrel of oil sales that Congress had mandated prior to the submission of the Strategic Review. Nevertheless, the Department did not complete any supplemental analysis before proceeding with extending the life of SPR's current configuration. Further, it had not analyzed the costs and benefits of the additional 147 million barrels of oil sales that Congress subsequently mandated. In fact, the Department still had not identified the optimum SPR configuration and capabilities as of August 2019.

## Ongoing Analysis

In the absence of clear decisions regarding the optimum size and configuration for SPR, the Department is conducting ongoing analyses to examine potential future configurations and capabilities. As discussed above, one such study will examine the effects of legislatively-directed oil sales and discuss alternatives on how the agency could handle the possibility of excess SPR facilities created by the mandated sales. Additionally, the Department is currently evaluating what SPR should be designed to do and will then use the results to determine what SPR size is necessary to achieve those capabilities. We commend the Department for initiating further analysis; however, we believe, and the Department has previously acknowledged, that an analysis of the optimum SPR configuration and capabilities should have preceded significant investments in SPR's infrastructure. As such, we encourage the Department to complete its ongoing studies as expeditiously as possible, and to use the results of those studies to provide clear and decisive direction to its SPR modernization efforts.

## Impact

Without a complete examination of the role and mission of SPR, the Department is at risk of not allocating its limited modernization resources toward those activities most critical to the future of SPR. The Department is approaching a critical juncture in its modernization planning efforts. Actual project costs were less than $140 million through the end of fiscal year 2019; however, the Department expects to spend more than $1 billion through 2023 as the LE2 project enters its construction phase. As noted by an independent project peer review team, as the LE2 project moves into the detailed design stage, changes in scope will likely lead to increased cost and schedule impacts. As such, the Department should determine which project scope is most likely or unlikely to change as soon as possible to help direct the focus of the design effort and minimize costs.

Additionally, Congress limited SPR modernization fundraising to a 4-year period that concludes in fiscal year 2020. Through the end of fiscal year 2018, the Department had generated approximately $600 million in funding through oil sales and planned to fund the balance of project costs with oil sales in fiscal years 2019 and 2020. Given the upcoming spending plan and the limited window Congress gave the Department to generate funding, it is imperative that the Department complete its analysis as soon as possible and expeditiously identify the optimum SPR size and configuration for the 21st century.

RECOMMENDATIONS

To ensure that the Strategic Petroleum Reserve is optimized for the energy security challenges of the 21st century, we recommend that the Assistant Secretary for Fossil Energy:

1. Identify the optimum Strategic Petroleum Reserve configuration and capabilities for the present and future needs of the United States.

2. Ensure that the Life Extension – Phase II project's scope and completion criteria corresponds with the optimum Strategic Petroleum Reserve configuration.

MANAGEMENT RESPONSE

Management concurred with the report's recommendations and stated that corrective actions have been initiated to address the issues identified in the report. As a result of world events leading to simultaneous global oil demand reduction and over production, the Department's leadership has begun policy discussions on the need for SPR capacity in response to oversupply conditions. Thus, the Office of Petroleum Reserves stated that it will complete an SPR Post-Sale Configuration Study to include an evaluation of responses to this new market reality. According to management, the revised study will inform deliberations within the Administration and in Congress toward decisions on the SPR's future size and configuration. Additionally, management stated that it has organized the Life Extension – Phase II sub-projects into categories that provide agility in adjusting the project's scope and completion criteria to correspond with changes, if any, to the SPR's configuration.

AUDITOR COMMENTS

Management's comments and planned corrective actions are responsive to our recommendations. Management comments are included in Attachment 3.

Attachments

cc: Chief of Staff
Under Secretary of Energy
Assistant Secretary, Office of Fossil Energy
Deputy Assistant Secretary, Office of Petroleum Reserves

## OBJECTIVE, SCOPE, AND METHODOLOGY

### OBJECTIVE

We initiated this audit to determine whether the Department of Energy's Strategic Petroleum Reserve (SPR) modernization program was addressing the congressional findings in the Bipartisan Budget Act of 2015.

### SCOPE

We conducted this audit between May 2018 and December 2019. We performed fieldwork at the Office of Petroleum Reserves in Washington, DC and the SPR Project Management Office in New Orleans, Louisiana. We focused our work on the Department's planning efforts for its SPR modernization program. This audit was conducted under Office of Inspector General project number A18OR030.

### METHODOLOGY

To accomplish the audit objective, we:

- Reviewed laws, regulations, and program guidance applicable to the SPR modernization program;
- Held discussions with key Department and contractor officials to gain an understanding of the modernization program's challenges;
- Reviewed applicable contract requirements, performance measures, and progress reports for the SPR modernization program; and
- Reviewed project management documentation, including execution plans, risk management plans, and acquisition strategies pertaining to the SPR's Life Extension – Phase II project.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. Accordingly, we assessed internal controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. Finally, computer-processed data did not materially support the findings, conclusions, or recommendations of the audit objective, and therefore, we did not perform a reliability assessment.

Management waived the exit conference on May 27, 2020.

## RELATED REPORTS

### Office of Inspector General

- Audit Report on *The Strategic Petroleum Reserve's Drawdown Readiness* (DOE/IG-0916, July 2014). The audit disclosed that while the Department of Energy generally maintained the Strategic Petroleum Reserve (SPR) in a manner to ensure drawdown readiness, SPR was not fully successful in meeting all of its operational performance criteria. In particular, due to the suspension and deferral of various maintenance and remediation activities, SPR was unable to achieve the maximum drawdown rate specified in its performance criteria, could not store oil at its full capacity, and had not ensured that its full inventory was available for drawdown. These conditions occurred, in part, because the Department had not performed a current comprehensive assessment and of SPR's long-term sustainability. Management concurred with the report's recommendations and agreed that a long-range strategic review was needed to ensure that SPR could meet current and future energy and economic security goals.

### Government Accountability Office

- Audit Report on *Strategic Petroleum Reserve: DOE Needs to Strengthen Its Approach to Planning the Future of the Emergency Stockpile* (GAO-18-477, May 2018). The Government Accountability Office (GAO) found that the Department had not identified the optimal size of the SPR. The GAO noted that the Department examined the benefits of several SPR sizes in its 2016 long-term strategic review of SPR, but did not identify an optimal size and the review was limited in several ways. In particular, GAO found that the Department did not fully consider recent and expected future changes in market conditions, such as the implications of falling net imports, or the role that increased levels of private reserves might play in responding to supply disruptions. The GAO believed that these changes had contributed to SPR and private reserves reaching historically high levels on a net imports basis. According to GAO, without addressing the limitations of its 2016 review and periodically performing reexaminations in the future, the Department cannot be assured that the SPR will be sized appropriately into the future.

- Audit Report on *Changing Crude Oil Markets: Allowing Exports Could Reduce Consumer Fuel Prices, and the Size of the Strategic Reserves Should Be Reexamined* (GAO-14-807, September 2014). The GAO found that changing market conditions have implications for the size, location, and composition of SPR. In particular, GAO noted that increased domestic crude oil production and falling net imports may affect the ideal size of SPR, and that removing crude oil export restrictions is expected to contribute to additional decreases in net imports in the future. According to GAO, the Department had taken some steps to assess the implications of changing market conditions on the location and composition of SPR but had not recently reexamined its size. Without such a reexamination, the Department cannot be assured that SPR is sized appropriately and risks holding excess crude oil that could be sold to fund other national priorities.

# MANAGEMENT COMMENTS

**Department of Energy**
Washington, DC 20585

May 26, 2020

MEMORANDUM FOR THE DEPUTY ASSISTANT INSPECTOR GENERAL

FROM: BARTON V. BARNHART *Barton V. Barnhart*
DEPUTY ASSISTANT SECRETARY
OFFICE OF PETROLEUM RESERVES

SUBJECT: Management Responses to the Office of the Inspector General Draft Report on The Strategic Petroleum Reserve's Modernization Program (A18OR030)

Thank you for the opportunity to review and comment on the draft audit report, "The Strategic Petroleum Reserve's Modernization Program." The Office of Petroleum Reserves (OPR), on behalf of the Assistant Secretary for Fossil Energy, offers the following comments in response to the recommendations provided in the draft report:

**OIG RECOMMENDATION 1:** *We recommend that the Strategic Petroleum Reserve identify the optimum configuration and capabilities for the present and future needs of the United States.*

**MANAGEMENT RESPONSE:** OPR concurs with recommendation one. OPR was close to finalizing a Strategic Petroleum Reserve (SPR) Post-Sale Configuration Study to aid decision makers in determining the appropriate physical configuration of the SPR that will meet present and future needs. However, as a result of world events leading to simultaneous global oil demand reduction and over production, the Department's leadership has begun policy discussions on the need for SPR capacity in response to oversupply conditions. Thus, OPR will complete the SPR Post-Sale Configuration Study to include evaluation of responses to this new market reality. The revised study will inform deliberations within the Administration and in Congress toward decisions on the SPR's future size and configuration.

**OIG RECOMMENDATION 2:** *We recommend that the Strategic Petroleum Reserve ensure that the Life Extension – Phase II project's scope and completion criteria corresponds with the optimum Strategic Petroleum Reserve configuration.*

**MANAGEMENT RESPONSE:** OPR concurs with recommendation two. OPR and the SPR Project Management Office have organized Life Extension – Phase II (LE2) sub-projects into categories that provide agility in adjusting LE2 project scope and completion criteria to correspond with changes, if any, to the SPR's configuration.

## FEEDBACK

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