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United States Government Accountability Office
Washington, DC 20548

April 12, 2007

Congressional Requesters:

Subject: Oil and Gas Royalties: Royalty Relief Will Cost the Government Billions of Dollars but Uncertainty Over Future Energy Prices and Production Levels Make Precise Estimates Impossible at this Time

Oil and gas from federal lands and waters is critical to meeting the nation's energy needs, providing about 35 percent of all oil and 25 percent of all the natural gas produced in the United States in fiscal year 2005. Oil and gas companies that lease federal lands and waters agree to pay the federal government royalties on the resources extracted and produced from these leases. In 1995—a time when oil and natural gas prices were significantly lower than they are today—Congress passed the Outer Continental Shelf Deep Water Royalty Relief Act of 1995 (DWRRA), which authorized the Department of the Interior's (Interior) Minerals Management Service (MMS) to provide "royalty relief" on oil and gas produced in the deep waters of the Gulf of Mexico from leases issued from 1996 through 2000. This "royalty relief" waived or reduced the amount of royalties that companies would otherwise be obligated to pay. In implementing the DWRRA for leases sold in 1996, 1997, and 2000, MMS specified that royalty relief would only be applicable if oil and gas prices were below certain levels, known as "price thresholds," thereby protecting the government's royalty interests should oil and gas prices increase significantly. MMS did not include price thresholds for leases it issued in 1998 and 1999. Because oil and natural gas prices have risen significantly in recent years, the omission of price thresholds on the leases issued in 1998 and 1999 has resulted in significant foregone royalties to the federal government. In an effort to recoup some of these royalties, Interior is currently negotiating with some of the oil and gas companies that own these leases. Congress has also been considering legislative actions to recoup foregone royalty revenues on these leases or to encourage companies to negotiate with MMS. In addition to the foregone royalties on the 1998 and 1999 leases, one company, Kerr-McGee, is currently pursuing a legal challenge to the Interior's authority to place price thresholds on any deep water leases issued between 1996 and 2000 under the DWRRA.¹ If successful, this legal challenge would lead to additional foregone royalties on leases issued in 1996, 1997, and 2000.

We reported to the Senate Committee on Energy and Natural Resources in January 2007 that the royalty relief for leases issued under the DWRRA will likely cost the federal government billions of dollars, but that the final costs have yet to be

¹ Kerr-McGee Oil and Gas Corp. v. Burton, No. CV06-0439LC (W.D. La. March 17, 2006).

determined.² At that time, MMS' most recent estimates of forgone royalties were made in October 2004. In light of these findings, you asked us to evaluate the potential for foregone royalties resulting from the omission of price thresholds on the leases issued in 1998 and 1999. We are also reporting on the status of Kerr-McGee's legal challenge to the Interior's authority to set price thresholds for the leases issued in 1996, 1997, and 2000 under the DWRRA, and the potential implications this challenge could have on federal royalty revenues.

To evaluate the potential for foregone royalties on the 1998 and 1999 leases, we reviewed estimates made by MMS in October 2004 as well as its updated estimates from February 2007. Specifically, we reviewed MMS' methodology and assumptions that were used to estimate the amount of future oil and natural gas production from DWRRA leases, and we examined the timing of this future production using decline curve analysis—an engineering tool that projects future production based on the decline in past production. We also reviewed statistical data on field sizes, discovery success rates, and drilling rig availability in the deep waters of the Gulf of Mexico to assess the likelihood of future oil and gas discoveries on DWRRA leases. In addition to reviewing MMS' estimates, we developed and analyzed a series of scenarios to study the uncertainty surrounding estimates of future foregone royalties. These scenarios used a range of assumptions about oil and natural gas prices and future production levels. Since MMS has not yet updated its estimate of the forgone royalties from leases issued in 1996, 1997, and 2000 should thresholds no longer apply, we did not have all of the available data to fully report on expected future foregone royalties on these leases. However, we did evaluate MMS' methodology and assumptions used to make its 2004 estimate of foregone revenue during the three year period and provide our comments on this. We also collected information from MMS on the amount of royalties that have already been collected on the 1996, 1997, and 2000 leases, which may need to be refunded if the federal government loses the ongoing legal challenge related to these leases. Finally, we worked with MMS and reviewed legal documents to provide an update on the status of the legal challenge. A more detailed description of our scope and methodology is provided in enclosure 1. We conducted our review from September 2006 through March 2007 in accordance with generally accepted government auditing standards.

In summary:

The absence of price thresholds in leases issued in 1998 and 1999 has already cost the government about \$1 billion and MMS' most recent estimate in February 2007 indicates a range of future foregone royalties of between \$6.4 billion and \$9.8 billion over the lives of the leases. We believe the methodology and assumptions used by MMS to make these estimates are reasonable. However, because there is considerable uncertainty about future oil and natural gas prices and production levels, actual foregone royalties could end up being higher or lower than MMS's estimates. Our analysis shows that future foregone royalties are quite sensitive to changes in prices or in the amount of oil and natural gas produced. For example, one

² *Oil and Gas Royalties: Royalty Relief Will Likely Cost the Government Billions, but the Final Costs Have Yet to Be Determined*, [GAO-07-369T](#) (Washington, D.C.: January 18, 2007).

scenario that assumed high production levels and a price of \$70 per barrel for oil and \$6.50 per thousand cubic feet for natural gas—prices that are higher than those used by MMS but within the range of recent market prices—indicated that the future foregone royalties could be as high as \$10.5 billion. Alternatively, a scenario that assumed low production levels and \$50 per barrel for oil and \$6.50 per thousand cubic feet for natural gas indicated that future foregone royalties could be as low as \$4.3 billion. MMS is currently negotiating with oil and gas companies to apply price thresholds to future production from the 1998 and 1999 leases. To date, the results of these negotiations have been mixed – 6 of the 45 companies involved have agreed to terms; others have agreed to negotiate but have not yet come to terms; and some companies have yet to agree to negotiate.

With regard to the legal challenge to the Interior’s authority to include price thresholds on leases issued under the DWRRA, Kerr-McGee filed suit in early 2006, but agreed to enter mediation with Interior in an attempt to resolve the issue. The mediation was unsuccessful and litigation has resumed. If the government loses this litigation it will lead to additional foregone royalty revenues from the 1996, 1997, and 2000 leases that included price thresholds. The additional foregone royalty revenues could include royalties on these leases totaling approximately \$1 billion that have already been collected and which may have to be refunded as well as royalties on future production. MMS estimated in October 2004 that potential foregone royalties on future production could be up to \$60 billion over the life of the leases, should the federal government lose the legal challenge. In our review of the methodology and assumptions used in MMS’ estimate, we found that MMS may have over-estimated the amount of oil and natural gas that would be produced from these leases over the course of their lifetime. MMS officials agreed with this assessment and said that an updated estimate of foregone revenue from these leases might be considerably lower than the \$60 billion figure but that they are not currently working to develop a revised estimate.

The Congress needs accurate and timely information to consider legislative action to recoup forgone royalties. Because the amount of royalties potentially recouped from such action may be dependent upon fluctuating oil and gas prices and changing production volumes, we are recommending that MMS provide to the Congress (1) the status of the leases and the annual amount of royalties that have been foregone on the 1998 and 1999 DWRRA leases until the issue is resolved, (2) the status of the leases and the annual amount of royalties collected to date from the 1996, 1997, and 2000 DWRRA leases until the Kerr-McGee suit is resolved, and (3) periodic estimates of future foregone royalties from 1998 and 1999 DWRRA leases and future royalties that may be at risk from 1996, 1997, and 2000 DWRRA leases until these issues are resolved.

Failure to Include Price Thresholds in 1998 and 1999 Leases Will Cost the Government Billions in Foregone Royalty Payments

As Assistant Secretary Allred of the Department of the Interior recently testified before the Congress, the absence of price thresholds in leases issued in 1998 and 1999 has already cost the government almost \$1 billion. In February 2007, MMS estimated a range of potential future foregone revenue for these leases of between \$6.4 billion

and \$9.8 billion. MMS calculated these estimates under a range of assumptions about oil and natural gas prices and future production levels. MMS used two price assumptions—one employing a constant price of \$45 per barrel of oil equivalent and the other using the Office of Management and Budget’s projected oil and gas prices, which escalate through time.³ For future production volumes from the 1998 and 1999 leases, MMS made low and high estimates—the low estimate did not allow for expected growth in oil and natural gas reserves, while the high estimate included expected growth in reserves based on past experience with oil and natural gas leases in the Gulf of Mexico.⁴ Reserves are the amount of oil (or natural gas) that is believed to be economically recoverable at current technology and prices. Reserve growth is the tendency of the initial reserve estimates to increase or “grow” in the future as more becomes known about the oil and gas field. We reviewed MMS’ assumptions and methodology for estimating the potential foregone revenue from 1998 and 1999 leases and found them to be reasonable.

In order to provide further perspective on just how much these future costs may vary, we developed and analyzed different scenarios that illustrate how the cost to the federal government is sensitive to changes in both oil and natural gas prices and future production volumes.⁵ In developing these scenarios, it is important to understand that the three key variables that determine total federal royalty revenues are production volume, sales price, and royalty rate. Royalties paid to the federal government are then calculated using the following equation: *Royalty Revenue = volume sold x sales price less deductions x royalty rate.*

Accordingly, our scenarios employ a range of values for oil and natural gas prices and future production volumes to illustrate the uncertainty surrounding potential foregone federal royalty revenues.⁶ Since oil and natural gas prices have historically been volatile, we selected a variety of prices, ranging from a low of \$36 per barrel of oil to a high of \$70 per barrel and a low of \$4.50 per thousand cubic feet of natural gas to a high of \$6.50 per thousand cubic feet. In our analyses, we assumed that price thresholds would rise 2.1 percent per year, based on their average annual increase over the past 10 years. Similarly, our scenarios included low and high volume estimates for future oil and natural gas production from these leases. In these scenarios, the estimated foregone royalty revenues vary significantly. For example, an oil price of \$50 per barrel and a natural gas price of \$6.50 per thousand cubic feet

³ One barrel of oil equivalent (BOE) equals one barrel of oil or 5.62 thousand cubic feet of natural gas.

⁴ As oil and gas reserves are developed and more knowledge of the field is obtained, proven reserves generally experience some growth.

⁵ These scenarios are not probabilistic estimates of what may actually happen with royalty revenue. Rather, they are illustrative examples using estimates of future oil and natural gas production that we believe are reasonable based on the history of leases in the Gulf of Mexico and using oil and gas prices that are within the range of prices that have existed in the past three years. As such, we believe the scenarios are reflective of plausible possibilities, but we do not assign any probabilities to any of the scenarios.

⁶ The royalty rate for DWRRA leases in less than 400 meters of water is 16.67 percent, and the royalty rate for leases in waters greater than 400 meters is 12.5 percent.

and low production volumes results in \$4.3 billion in foregone royalties.⁷ With the same prices but higher production volumes, this estimate increases to \$7.4 billion. Alternatively, with \$70 per barrel of oil and \$6.50 per thousand cubic feet of natural gas, the low production volume assumption yields foregone royalties of \$6.2 billion and the high production volume assumption yields \$10.5 billion. For more detailed information on each of the scenarios and the estimated potential foregone royalty revenue, see enclosure 2.

To recoup some of the potential foregone revenue on the 1998 and 1999 leases, MMS is currently negotiating with oil and gas companies in an attempt to apply price thresholds to future production from these leases. If successful, this approach would partially undo the omission of price thresholds for future production, thereby implementing the royalty relief as though price thresholds had been included in the leases. However, the results of these negotiations have been mixed—as of late February, 2007, only 6 of 45 companies had agreed to terms, while others were either negotiating or had not yet agreed to negotiate. Moreover, uncertainty about the current legal challenge to Interior’s authority to set price thresholds on any DWRRA leases may further deter or complicate negotiated settlements.

A Successful Challenge to Interior’s Authority to Include Price Thresholds On Leases Issued Under the DWRRA Could Cost the Government Billions In Additional Revenues

Kerr-McGee filed suit against the Department of the Interior in early 2006, challenging its authority to place price thresholds on any of the leases issued under the DWRRA. In particular, this suit seeks to in effect, remove price thresholds from leases issued in 1996, 1997, and 2000. In June 2006, Kerr-McGee agreed to enter into mediation with Interior in an attempt to resolve the issue; however, the mediation was unsuccessful and litigation has resumed. As of July 2006, the 1996, 1997, and 2000 leases have generated approximately \$1 billion in royalties. If the government loses this legal challenge, it may be required to refund these royalties and to forego future royalties on these leases.⁸ As a result, the government could stand to lose billions of additional dollars. In addition to the impact on royalties on the 1996, 1997, and 2000 leases, losing the suit brought by Kerr-McGee would also impact the government’s negotiation of price thresholds for the 1998 and 1999 leases.

MMS estimated in October 2004 that foregone royalties on the 1996, 1997, and 2000 leases could be as high as \$60 billion. Because much has been learned about the productivity of the leases since that initial estimate and because price expectations have changed, an updated estimate may differ significantly from the 2004 estimate.

For example, of the 2,369 leases issued in 1996, 1997, and 2000, 1,294 have expired without ever producing oil or gas. Of the remaining leases, 12 have produced and

⁷ It should be noted that if oil prices were to fall and remain at \$36 per barrel or below and natural gas prices at \$4.50 per thousand cubic feet or below, no royalties would be due even if the price thresholds that were imposed on the 1996, 1997, and 2000 leases were applied to the 1998 and 1999 leases.

⁸ Future foregone royalties are dependent on the “royalty suspension volume.” Royalty suspension volumes are cumulative production amounts above which royalty relief no longer applies.

have either reached the end of their productive lives or appear incapable of further production; 38 were still producing as of July 2006; 26 appear capable of producing in the future after being connected to infrastructure; and 999 are still active but untested for oil and gas. On the other hand, oil and natural gas prices have increased since the estimate of foregone royalties in 2004. In our review of the methodology and assumptions used in MMS' 2004 estimate, we found that MMS may have made overly optimistic assumptions about the amount of oil and natural gas production that would occur over the lifetime of these leases. MMS officials agreed with this assessment and also agreed that a new estimate of potential foregone royalties might be considerably lower than their earlier \$60 billion figure. However, MMS officials told us that they are not currently working to update these figures.

Conclusions

It is impossible to precisely estimate how much royalty revenue the federal government could lose as the result of the 1998 and 1999 leases that did not include price thresholds or if Interior loses the legal challenge to its authority to include price thresholds for the leases issued in 1996, 1997, and 2000, because of the inherent uncertainty of future oil and natural gas prices and production volumes.

Nonetheless, MMS estimates of foregone royalty revenues from 1998 and 1999 leases seem reasonable, in light of our analysis. There is considerably more uncertainty, however, regarding potential foregone royalty revenue for leases issued in 1996, 1997, and 2000. Although MMS has not yet updated its 2004 estimate of the future potential royalty losses on the leases at issue in the Kerr-McGee suit, it is clear that such an update could differ significantly from its earlier estimate because of likely changes to production and price assumptions. As Congress considers ways to address foregone royalties, it will need the best available information on a year-to-year basis about royalties that have been foregone to-date, those that have been paid but that are at risk in the suit, and estimates of how much is at stake going forward. Because new information will become available every year that these leases are in effect, we expect these figures and estimates to change significantly over time.

Recommendations for Executive Action

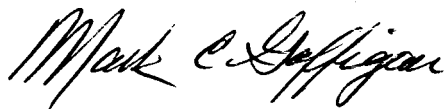
To assist the Congress in its efforts to find appropriate remedies for foregone royalty revenues or those that may be at risk, we recommend that MMS report to the Congress (1) the status of the leases and the annual amount of royalties that have been foregone on the 1998 and 1999 DWRRA leases until the issue is resolved, (2) the status of the leases and the annual amount of royalties collected to date from the 1996, 1997, and 2000 DWRRA leases until the Kerr-McGee suit is resolved, and (3) periodic estimates, as MMS resources allow, of future foregone royalties from 1998 and 1999 DWRRA leases and future royalties that may be at risk from 1996, 1997, and 2000 DWRRA leases until both of these situations are resolved.

Agency Comments

We provided a draft of this report to the Department of the Interior and the Minerals Management Service (MMS) for review and comment. They provided oral comments, which we have incorporated as appropriate. In general, MMS officials said they agreed with our findings and recommendations. Specifically, MMS officials said that providing the Congress with both the retrospective annual amounts of foregone royalties from 1998 and 1999 DWRRA leases and royalties collected from 1996, 1997, and 2000 leases would be manageable. However, agency officials stated that providing the Congress annual prospective estimates of both of these values would require significant work and cost. Accordingly, we revised our recommendations to provide MMS with the flexibility to develop these estimates as MMS resources allow or as needed by the Congress.

We are sending copies of this report to appropriate Congressional committees, the Secretary of the Interior, the Director of MMS, the Director of the Office of Management and Budget, and other interested parties. We will also make copies available to others upon request. In addition, the report will be available at no charge on GAO's Web site at <http://www.gao.gov>.

If you or your staff have any questions or comments about this report, please contact me at (202) 512-3841 or gaffiganm@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made contributions to this report include Ron Belak, Glenn C. Fischer, Dan Haas, Frank Rusco, and Barbara Timmerman.



Mark Gaffigan
Acting Director, Natural Resources
and Environment

Enclosures

Scope and Methodology

To determine the fiscal impacts of not including price thresholds on deep water oil and gas leases issued under the Outer Continental Shelf Deep Water Royalty Relief Act of 1995 (DWRRA), we met with MMS personnel in the Economics Division in Herndon, Virginia. We reviewed their October 2004 estimate of forgone royalties due to not including price thresholds in 1998 and 1999 deep water leases and their estimate of royalties that could be forgone if price thresholds did not apply to 1996, 1997 and 2000 DWRRA leases. We concluded that they followed standard engineering and financial practices and had generated the estimates in good faith. However, more than two years had passed since their estimates, and we believed that the estimates needed to be updated. MMS concurred and gave us their preliminary results in March 2007. We recently reviewed these preliminary results and generally concurred with their methodology and assumptions as well as with the magnitude of their estimates. During the course of our work in 2006, we visited MMS's Gulf of Mexico Regional Office in New Orleans and interviewed engineers and geologists on technical aspects of oil and gas production in the deep waters of the Gulf of Mexico. In addition, we contacted industry representatives for opinions on oil and gas exploration and development in the deep waters of the Gulf of Mexico.

To perform our scenario analysis, we identified within MMS's Technical Information Management System (TIMS) all 3,401 leases issued under the DWRRA, 1,032 of which were issued in 1998 and 1999. From this database, we were able to identify the status of these leases and the extent to which they had been explored and developed and the production that had occurred on some of them. As of July 2006, a total of 33 of the leases issued in 1998 and 1999 have produced, are currently producing, or are expected to produce oil and gas in the future. Four of the 33 leases have either stopped producing or appear to be no longer capable of producing significant amounts; 14 are still producing; and 15 are expected to commence production at some future time. As of January 1, 2007, 563 additional 1998 and 1999 leases were still active but had not yet been tested for oil and gas. As of March 28, 2007, 486 of the leases issued in 1998 and 1999 have expired, been relinquished, or been terminated.⁹ We also collected from TIMS pertinent information current through July 2006 on the status of each lease and the estimated reserves of producing leases and leases capable of producing but not yet connected to infrastructure (producible leases). We interviewed MMS personnel in New Orleans to better understand how these reserve estimates were made. For producing and producible leases, we corroborated lease information in TIMS with MMS's final bid results. We also obtained recent information on reserve growth for each producing or producible lease and obtained monthly oil and gas production volumes through July 2006 from MMS's Oil and Gas Operations Reports (OGOR). We reviewed production data for characteristic decline patterns, questioned MMS personnel on how they verified these data and on reasons for periods of time with zero production (predominantly the result of hurricane activity), and compared each lease's cumulative production with reserve estimates in TIMS. We found the data in TIMS and in OGOR to be sufficiently reliable for the purposes of our analysis.

⁹ Total lease numbers for 1998 and 1999 leases do not add to 1,032 due to overlapping time periods.

In consultation with MMS experts, we estimated the timing of future production to identify and exclude from our analysis the possible production volumes that will be royalty free when sales prices drop below anticipated price thresholds in the future. To determine the timing of future production from currently producing leases, we used standard decline curve analysis, which projects future production based on the declining pattern of past production. For 1998 and 1999 producing leases, we segregated leases into three zones based on water depth, which determines how much production is royalty free. Zone A contains leases in waters from 200 to 400 meters deep (17.5 million BOE exempt from royalties); zone B contains leases in waters from 400 to 800 meters deep (52.5 million BOE exempt from royalties); and zone C contains leases in waters deeper than 800 meters (87.5 million BOE exempt from royalties). We constructed separate decline curves for the oil and gas fraction for leases in zone C, but did not do so for leases in the A and the B zones because these leases were either not producing or were producing insignificant volumes. When constructing decline curves, we adjusted for time periods of zero production due to major hurricanes. We also ensured that the total production predicted by the decline curves was equal to the total reserves estimated by MMS. For larger leases, we tracked projected cumulative production to predict whether a lease would exceed its royalty suspension volume so as not to include the amounts over the suspension volumes in our estimate of forgone royalties.

We also used decline curve analysis to predict the timing of future production from producible leases, all of which are in the C zone. In consultation with MMS experts, we constructed a composite gas decline curve and a composite oil decline curve using production data from all producing DWRRA leases in the C zone, adjusted for missing data. Based on advice from MMS and industry representatives, we assumed that producible leases would produce for 15 years. Based on the 7 year average time from discovery to first production of 144 producing fields in Gulf of Mexico waters deeper than 800 meters, we assumed that each of the producible C zone leases would first start producing seven years after its discovery.

To project production from future discoveries on 1998 and 1999 leases, we examined MMS projections for future drilling activity, historic discovery rates, average field sizes, and anticipated lease expiration dates for DWRRA leases in waters deeper than 800 meters, where MMS anticipates all the future DWRRA discoveries to occur. First, we assumed that the range for the number of possible untested leases drilled in all of the deep waters of the Gulf of Mexico would be between 30 and 60. This assumption was based on the availability of rigs to drill exploratory wells in waters deeper than 800 meters and MMS projections in the 2006 deep water report. Second, we assumed the success rate of future deep water lease discoveries would be the same as for such deep water leases issued from 1974 through 1995—this success rate was 28 percent. Third, we scheduled the expiration dates of the 1998 and 1999 leases for each year through 2009 and calculated for each of these years the percentage of all untested deep water leases below 800 meters that would be 1998 and 1999 leases, assuming that there would be 3,700 total active deep water leases each year. Fourth, we assumed that each new field discovery would consist of two leases because 97 percent of the existing 198 fields in Gulf of Mexico waters deeper than 800 meters are composed of from one to four leases, with two leases being the average field size.

Finally, for 2007 through 2009, we assumed the number of field discoveries on 1998 and 1999 leases would be between 5 and 10. This assumption was derived by multiplying the estimated range of untested leases that could be drilled in all Gulf of Mexico deep waters (30 to 60 per year) by the percentage of all deep water leases that are active untested 1998 and 1999 leases and by the assumed success rate of 28 percent. We doubled this number in order to account for the average field consisting of two leases. For these new discoveries, we converted these numbers into oil and gas production volumes by multiplying them by the average of the reserves for all producing and producible DWRRA leases, adjusting for the possibility that some leases would have reserves greater than the royalty suspension volume of 87.5 million BOE.

With these assumptions, we developed several scenarios that illustrate that the potential for forgone royalties is highly dependent upon prices and production volumes. We selected the price scenario of \$36 for oil and \$4.50 for gas to illustrate that there would be no forgone royalties at these prices because they should remain below predicted price thresholds for the lives of the DWRRA leases. We chose prices of \$50 and \$70 for oil and \$6.50 for gas because these were in the range of common prices during 2006. We did not escalate oil and gas prices over the time period of our scenario. However, we increased 2006 price thresholds by 2.1 percent per year, based on the average increase over the past 10 years. To illustrate the impact of changing production volumes on forgone royalties from producing and producible leases, we assumed low and high production levels. Our low production assumption is equal to MMS's estimated reserves. Our high production assumption is equal to MMS's estimated reserves multiplied by the average weighted growth factor. To illustrate the impact of changing production volumes on forgone royalties from future discoveries, we also selected low and high assumptions. Our low production assumption is 5 discoveries, and our high assumption is 10 discoveries. We did not multiply production assumptions from future discoveries by growth factors but such growth is possible.

Scenarios Illustrating the Sensitivity of the Cost to the Federal Government to Changes in Oil and Natural Gas Prices and Future Production Volumes

We present two scenarios below to illustrate the range of potential future costs to the federal government that could result from the omission of price thresholds in leases issued in 1998 and 1999.

Scenario 1 illustrates possible foregone federal royalty payments resulting from MMS’s omission of price thresholds in leases issued in 1998 and 1999 when oil and natural gas prices exceed price thresholds (see table 1).¹⁰ Specifically, we selected an oil price of \$50 per barrel and a natural gas price of \$6.50 per thousand cubic feet to illustrate the forgone royalties with both low and high volume estimates of future oil and gas production. In this scenario, the productive timeframe is from August 2006 through the lives of the leases—about 25 years. In the low production volume estimate, we use MMS’s “ungrown reserve” estimates and assume 5 additional leases are discovered in the future. Our scenario results in \$4.3 billion in foregone royalties. This estimate increases to \$7.4 billion in the high production volume case, which uses MMS’ “grown reserves” and 10 future discoveries.

Table 1: Scenario 1 assumes that from 1998 and 1999 leases, oil would be sold for \$50 per barrel and natural gas would be sold for \$6.50 per thousand cubic feet.

	Ungrown Reserves and 5 Future Discoveries	Grown Reserves and 10 Future Discoveries
Foregone royalties on Future Production from Producing and Producible Leases	\$3.8 Billion	\$6.0 Billion
Additional Foregone Royalties on Future Production from Leases with New Discoveries	\$0.5 Billion	\$1.4 Billion
TOTAL FOREGONE ROYALTIES	\$4.3 Billion	\$7.4 Billion

Source: GAO

Scenario 2 illustrates possible forgone royalties with a higher oil price, but the price is within the range of prices we have seen in recent years (see table 2). Using similar assumptions on production volumes as in Scenario 1, \$70 per barrel of oil and \$6.50 per thousand cubic feet of natural gas yields \$6.2 billion in forgone future royalties for the low estimate and \$10.5 billion in forgone future royalties for the high estimate.

¹⁰ In some of our scenarios, oil and gas prices drop below price thresholds in the latter years of the producing lives of the leases. In these cases, this royalty revenue is not considered forgone royalties.

Table 2: Scenario 2 assumes that from 1998 and 1999 leases, oil would be sold for \$70 per barrel and natural gas would be sold for \$6.50 per thousand cubic feet.

	Ungrown Reserves and 5 Future Discoveries	Grown Reserves and 10 Future Discoveries
Foregone royalties on Future Production from Producing and Producible Leases	\$5.2 Billion	\$8.1 Billion
Additional Foregone Royalties on Future Production from Leases with New Discoveries	\$1.0 Billion	\$2.4 Billion
TOTAL FOREGONE ROYALTIES	\$6.2 Billion	\$10.5 Billion

Source: GAO

List of Addressees

The Honorable Jeff Bingaman
Chairman, Committee on Energy and Natural Resources
United States Senate

The Honorable Carl Levin
Chairman, Permanent Subcommittee on Investigations
Committee on Homeland Security and Governmental Affairs
United States Senate

The Honorable Norm Coleman
Ranking Member, Permanent Subcommittee on Investigations
Committee on Homeland Security and Governmental Affairs
United States Senate

The Honorable Nick J. Rahall
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The Honorable Darrel E. Issa
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