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United States Government Accountability Office
Washington, DC 20548

June 21, 2006

Congressional Requesters:

Subject: *Royalty Revenues: Total Revenues Have Not Increased at the Same Pace as Rising Oil and Natural Gas Prices due to Decreasing Production Sold*

In fiscal year 2005, federal and Native American lands supplied about 35 percent of the oil and 26 percent of the natural gas produced in the United States. Companies that lease these lands to produce oil and natural gas pay royalties to the Department of the Interior's Minerals Management Service (MMS) based on a percentage (the royalty rate) of the cash value of the oil and natural gas produced and sold. As an alternative to collecting cash royalty payments, MMS has the option to take a percentage of the actual oil and natural gas produced (referred to as "taking royalties in kind") and selling it themselves or using it for other purposes, such as filling the nation's Strategic Petroleum Reserve (SPR). MMS reported collecting $7.4 billion in fiscal year 2001 and $8 billion in fiscal year 2005 in cash royalty payments and in revenue from its own royalty-in-kind sales of oil and natural gas. While these total royalty revenues increased by about 8 percent from 2001 to 2005, oil and natural gas prices rose substantially more—about 90 percent for oil and 30 percent for natural gas. Consequently, you asked us why oil and natural gas royalty revenues did not increase at the same pace as the increase in oil and natural gas prices.

In summary, federal and Native American royalty revenues did not increase at the same pace as oil and natural gas prices between 2001 and 2005 principally because the volumes upon which royalties are based declined substantially during this time. In assessing changes in royalty revenues, it is important to understand the three key variables of volume, price, and royalty rate that make up total royalty revenues. When reporting and paying royalties to MMS, companies must collect and report various data, including the volume of oil or natural gas sold, the sales price received less allowable deductions—such as transportation—to get the resource to market, and the royalty rate to be paid as specified in the oil and natural gas lease. Companies can calculate the royalty revenue they owe to the federal government using the three key variables illustrated in the following equation:

Royalty revenue = volume sold x sales price less deductions x royalty rate[1]

As summarized in table 1 and table 2, the volume of natural gas and oil that was sold decreased significantly between 2001 and 2005, largely offsetting the impact of increased sales prices on total royalty revenues.

Table 1: Natural Gas Royalty Statistics for Federal and Native American Lands

Fiscal year	Total volume sold (thousands of cubic feet)	Average sales price received (per thousand cubic feet)[a]	Average royalty rate (less deductions)	Total royalty revenues
2001	6,912,002,366	$5.05	0.145124	$5,062,170,355
2005	5,864,705,117	$6.59	0.137267	$5,304,520,628

Source: MMS.

[a]Average sale price rounded to nearest cent.

Table 2: Oil Royalty Statistics for Federal and Native American Lands

Fiscal year	Total volume sold (barrels)	Average sales price received (per barrel)[a]	Average royalty rate (less deductions)	Total royalty revenues
2001	699,346,399	$25.27	0.134703	$2,380,264,986
2005	434,142,391	$47.96	0.128498	$2,675,676,653

Source: MMS.

[a]Average sales price rounded to nearest cent.

In conducting our work, it was not possible with the available data to precisely determine how much of the change in total royalty revenues was due to a change in any one variable, as all three variables were changing over time at varying rates. For example, during any given month in which royalties are collected, each of the variables may either rise or fall compared to the previous month. For our analysis, however, we estimated a variable's contribution to the total dollar change in royalty revenues for oil and natural gas by assuming that the other two variables changed at a constant rate. Under this assumption, the total change in that variable from 2001 to 2005 closely approximated the actual change over the period. We also examined the effects of specific factors, such as hurricanes, on total volumes sold and average royalty rates. We obtained oil and natural gas data from MMS's financial system for fiscal years 2001 and 2005 to conduct our independent analysis to more fully explain the change in both natural gas and oil royalty revenues. We also interviewed MMS officials at their Lakewood, Colorado, office to solicit their views on why oil and natural gas royalty revenues did not increase at the same rate as prices between 2001 and 2005. The comparison of royalty revenues between 2001 and 2005 does not

[1]Companies report to MMS on Form MMS-2014 the volume sold (sales volume), the amount of revenue received from this sale (sales value), and the royalty revenue due to MMS (royalty value less allowances). The average sales price is calculated by dividing sales value by sales volume. The average royalty rate net of allowances is calculated by dividing royalty value less allowances by sales value.

include natural gas or oil production that is subject to royalty relief. Legislation and regulations exempt some production from certain leases in the Gulf of Mexico from royalties, and therefore these production volumes do not appear in the royalty revenue statistics.[2] Although the volumes subject to royalty relief were small, they are expected to grow in the future. We have ongoing work and plan a future report on royalty-relief policies and MMS efforts to estimate the impact of royalty relief on future royalty revenues. We coordinated and worked with the Department of the Interior's Office of Inspector General on this review. A detailed description of our methodology appears in enclosure I. We conducted our review from February through April 2006 in accordance with generally accepted government auditing standards.

Falling Natural Gas Production Volumes Have Largely Offset Rising Natural Gas Prices

As summarized in table 1, decreases in the volume of natural gas produced and sold between 2001 and 2005 have largely offset the impact of increased sales prices on total royalty revenues. Natural gas production volumes from federal and Native American lands decreased because of natural declines in older wells. In addition, hurricanes in 2005 contributed to a decline in natural gas production volumes by forcing companies to temporarily suspend natural gas production from wells in the Gulf of Mexico. Finally, the volume of gas upon which royalties are based in a given year is decreased by the amount of gas that is exempt from paying royalties under federal royalty-relief provisions. Natural gas volumes subject to royalty relief did grow between 2001 and 2005. In 2001, MMS reported about 5 billion cubic feet of natural gas were exempt from royalties under royalty-relief provisions. In 2005, MMS reported that these volumes increased to over 246 billion cubic feet of natural gas, with a total estimated royalty value of about $226 million. Volumes of natural gas subject to royalty relief are expected to grow in the future. We have ongoing work to examine royalty-relief policies and efforts to estimate the impact of royalty relief on future royalty revenues.

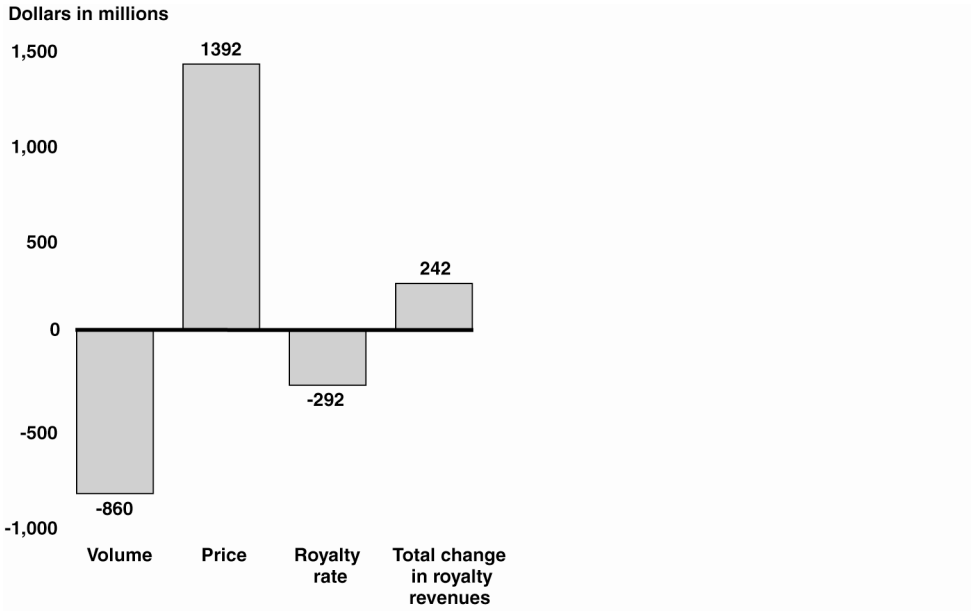
In addition to reduced production volumes, the average royalty rates on natural gas production from federal and Native American lands decreased from 2001 to 2005, contributing to the drop in royalty revenues. Royalty rates can vary depending on where the natural gas is produced. In general, average royalty rates for natural gas have decreased as production has declined in areas with higher royalty rates (such as shallow waters in the Gulf of Mexico where the royalty rate is 16.67 percent) and increased in areas with lower royalty rates (such as deep waters in the Gulf of Mexico where the royalty rate is 12.5 percent). Because the comparison of royalty revenues between years does not include production that is subject to royalty relief, the average royalty rate is not affected by production that is subject to royalty relief.

From fiscal years 2001 to 2005, total natural gas royalty revenues from federal and Native American lands increased by about $242 million (see table 1). We estimate that the rise in natural gas prices between 2001 and 2005 would have increased

[2]Certain leases issued in 1998 and 1999 did not contain price thresholds, resulting in additional royalty-free volumes which do not appear in the royalty revenue statistics.

royalty revenues by $1,392 million. Natural gas prices have risen since 2001 because demand for natural gas has expanded faster than supply. The domestic gas industry has been producing at near capacity, and the nation's ability to increase imports has reached its limits. Tight supplies have also made the market susceptible to extreme price spikes when either demand or supply changes unexpectedly, such as when hurricanes hit the Gulf Coast in late 2005. However, we estimate that a decline in the total natural gas volume sold resulted in a decrease of about $860 million in potential royalty revenues. In addition, a decline in the average royalty rate decreased potential royalty revenues by an additional $292 million. The relationship between the changes in natural gas royalty revenues due to an increase in the price of natural gas, decrease in volumes sold, and decrease in average royalty rate is illustrated in figure 1.

Figure 1: Estimated Effects of Volume, Price, and Royalty Rate on Federal and Native American Natural Gas Royalty Revenues, Fiscal Years 2001 to 2005



Source: GAO analysis of MMS data.

Note: Changes attributed to individual variables account for 99 percent instead of 100 percent of the actual change in total royalty revenues due to limitations in the methodology. See enclosure I for more details.

A significant portion of the $860 million decrease in potential royalty revenues associated with declining sales volumes appears to be the result of a decrease in natural gas production caused by the normal depletion of natural gas wells in shallow waters (i.e., waters less than 400 meters deep) of the Gulf of Mexico. MMS's Gulf of Mexico Offshore Region reported a precipitous decline in natural gas production in shallow waters of the Gulf starting in 1997. This decline continued from 2001 to 2005. MMS reported that natural gas production from shallow waters dropped from about 4.2 trillion cubic feet in 2001 to about 2.4 trillion cubic feet in 2005, while production

from deep waters (i.e., waters over 400 meters deep) remained relatively stable.[3] However, since companies are reporting the discovery of oil and natural gas fields in increasingly deeper water, MMS anticipates that production from deep water will increase in the future.

While older natural gas wells onshore also experienced declining production, these declines were overshadowed by an increase in natural gas production from new onshore wells. Onshore total natural gas volumes sold actually increased by about 17 percent from 2001 to 2005, according to MMS statistics. Had this onshore increase not occurred, the $860 million decrease in potential royalty revenues associated with declining sales volumes would have been greater. We have previously reported the increase in oil and natural gas activities on federal onshore lands managed by the Bureau of Land Management.[4] Permits issued to drill wells on these lands more than tripled from fiscal years 1999 to 2004, with much of the increase occurring in the Rocky Mountain states of Montana, Wyoming, Colorado, Utah, and New Mexico.

Hurricanes in the Gulf of Mexico also contributed to the decline in natural gas sales volume from 2001 to 2005 by forcing companies to temporarily suspend production. MMS reported that, during August and September 2005, total cumulative shut-in natural gas production was 196,481 million cubic feet, or about 5 percent of the annual natural gas production in the Gulf of Mexico. We estimate that this production could have resulted in royalty revenues of about $208 million, although it is unclear what portion of this production was subject to royalties.

In addition to the declining natural gas sales volumes, a declining average royalty rate also reduced total royalty revenues. From 2001 to 2005, the average royalty rate dropped from about 14.5 percent to about 13.7 percent, resulting in a decrease of about $292 million in potential royalty revenues. This decrease appears to have resulted largely from the decline in natural gas production in shallow waters of the Gulf of Mexico. Shallow water leases have royalty rates of 16.67 percent, while deeper water leases carry royalty rates of 12.5 percent. The increase in onshore production, where leases also carry a 12.5 percent royalty rate, has also contributed to the decline in the average royalty rate.

Declining Oil Sales Have Largely Offset Rising Oil Prices

As summarized in table 2, decreases in the volumes of oil produced and sold between 2001 and 2005 have largely offset the impact of increased sales prices on total royalty revenues. The oil volumes sold from federal and Native American lands declined principally because MMS took substantial volumes in kind and used these volumes to fill the SPR, instead of receiving cash royalty payments or selling the oil and

[3]Not all volumes produced are subject to royalties. The Outer Continental Shelf Deep Water Royalty Relief Act of 1995 exempts certain volumes from royalties. Hence, total volumes sold reported in tables 1 and 2 reflect volumes on which royalties wee paid, and as a result are less than total volumes actually produced for a given year.

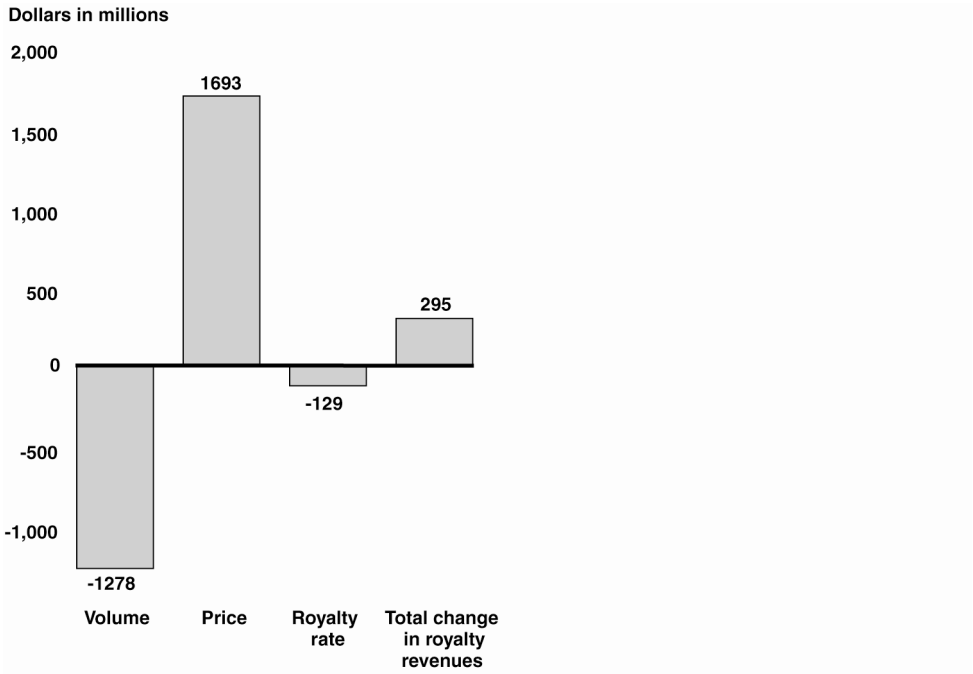
[4]GAO, *Oil and Gas Development: Increased Permitting Activity Has Lessened BLM's Ability to Meet Its Environmental Protection Responsibilities*, GAO-05-418 (Washington, D.C.: June 17, 2005).

collecting revenue from royalty-in-kind sales. As with natural gas, hurricanes in 2005 also contributed to a decline in oil

production volumes by forcing companies to temporarily suspend production from wells in the Gulf of Mexico. Also, the volume of oil upon which royalties are based in a given year is decreased by the amount of oil that is exempt from paying royalties under federal royalty-relief provisions. Although the comparison of royalty revenues between 2001 and 2005 does not include oil production that is subject to royalty relief, the volumes subject to royalty relief did grow between 2001 and 2005. In 2001, MMS reported about 2.6 million barrels of oil were exempt from royalties under royalty-relief provisions. In 2005, MMS reported that these volumes increased to about 29 million barrels of oil, with a total estimated royalty value of about $175 million. The oil volumes subject to royalty relief are expected to grow further, and we have work currently under way to examine royalty-relief policies and estimates of the impact on future royalty revenues. In addition to the declining oil sales volumes, a declining average royalty rate for oil also contributed to reduced total royalty revenues.

From fiscal years 2001 to 2005, total oil royalty revenues from federal and Native American lands increased by about $295 million (see table 2). We estimate that the rise in crude oil prices between 2001 and 2005 increased potential royalty revenues by $1,693 million. Crude oil prices rose during this period primarily because the growth in world oil demand has not been accompanied by a similar growth in crude oil supplies. Demand has increased, particularly in the United States, China, and India, while production has been voluntarily restricted by members of the Organization of Petroleum Exporting Countries or otherwise disrupted by events in Nigeria, Iraq, and Venezuela. In addition, hurricanes in the Gulf Coast in late 2005 disrupted the flow of oil into the United States and damaged oil facilities, leading to increased prices at that time. However, a decline in the total oil volume sold during this same period resulted in a decrease of about $1,278 million in potential royalty revenues. In addition, a drop in the average royalty rate caused another $129 million decrease in potential royalty revenues. The relationship between the changes in oil royalty revenues due to an increase in the price of crude oil, decrease in volumes sold, and decrease in average royalty rate is illustrated in figure 2.

Figure 2: Estimated Effects of Volume, Price, and Royalty Rate on Federal and Native American Oil Royalty Revenues, Fiscal Years 2001 to 2005



Source: GAO analysis of MMS data.

Note: Changes attributed to individual variables account for 97 percent instead of 100 percent of the actual change in total royalty revenues due to limitations in the methodology. See enclosure I for more details.

Most of the $1,278 million decrease in potential royalty revenues associated with declining sales volumes appears to be the result of transfers of royalty oil to the SPR. The Congress created the SPR to provide emergency oil in the event of a disruption in petroleum supplies. Managed by the Department of Energy (DOE), the SPR is a series of underground salt caverns along the coastline of the Gulf of Mexico that can store up to 700 million barrels of oil. MMS assists DOE in transferring oil into the SPR. Under royalty in kind, instead of receiving cash royalty payments, MMS takes the federal government's royalty share in oil. MMS can then sell the oil and collect revenue from the royalty-in-kind sales or use it for other purposes. In fact, MMS was directed to transfer the oil to the SPR. Since the oil was transferred and not sold, no cash royalty revenues were collected from a sale. MMS began assisting DOE with the transfer of royalty oil to the SPR in April 2002, after having stopped filling the SPR in December 2000. In 2005, MMS reported that it had assisted in transferring about 213 million barrels of oil to the SPR. This amount represents about 80 percent of the decrease in total oil volume sold from 2001 to 2005.

Hurricanes in the Gulf of Mexico also contributed to the decline in oil sales volumes from 2001 to 2005 by forcing companies to shut-in wells. MMS reported that during August and September 2005, total cumulative shut-in oil production was 40,828,134 barrels, or about 15 percent of the decline in total oil volumes sold from 2001 to 2005. We estimate that this shut-in production could have produced royalty revenues of at

least $270 million, although it is unclear what portion of this production was royalty-bearing and at what price the oil would have been sold. In addition, oil volumes sold from onshore federal and Native American lands decreased by 8 million barrels, or about 3 percent of the decrease in total oil volumes sold from 2001 to 2005.

In addition to the declining oil sales volumes, a declining average royalty rate also helped offset the increase in total royalty revenues due to increasing crude oil prices. From 2001 to 2005, the average royalty rate dropped from about 13.5 percent to about 12.8 percent, resulting in a decrease of about $129 million in potential oil royalty revenues. As with natural gas, this decrease appears to have resulted from an increase in the proportion of oil produced from deep waters in the Gulf of Mexico, where royalty rates are lower.

Agency Comments

We provided a draft of this report to the Department of the Interior for review and comment. The Minerals Management Service provided written comments, which are presented in enclosure II. MMS agreed with our observations and emphasized our conclusion that federal oil and gas royalty collections from 2001 through 2005 have not kept pace with rising oil and natural gas prices because of a decrease in the volumes of oil and natural gas sold during this period. MMS also provided comments to improve the report's technical accuracy, which we incorporated as appropriate.

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As agreed with your offices, unless you publicly announce the contents of this report, we plan no further distribution until 30 days from the date of this letter. At that time we will send 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 about this report, please contact me at (202) 512-3841 or wellsj@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 major contributions to this letter include Ron Belak, Glenn C. Fischer, Mark Gaffigan, and Frank Rusco.

Jim Wells
Director, Natural Resources
and Environment

Enclosures

The Honorable Jeff Bingaman
Ranking Minority Member
Committee on Energy and Natural Resources
United States Senate

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

The Honorable Carl Levin
Ranking Minority Member
Permanent Subcommittee on Investigations
Committee on Homeland Security and Governmental Affairs
United States Senate

The Honorable Daniel K. Akaka
United States Senate

The Honorable Maria Cantwell
United States Senate

The Honorable Thomas R. Carper
United States Senate

The Honorable Mark Dayton
United States Senate

The Honorable Byron L. Dorgan
United States Senate

The Honorable Richard J. Durbin
United States Senate

The Honorable Russell D. Feingold
United States Senate

The Honorable Dianne Feinstein
United States Senate

The Honorable Tim Johnson
United States Senate

The Honorable John F. Kerry
United States Senate

The Honorable Frank R. Lautenberg
United States Senate

The Honorable Robert Menendez
United States Senate

The Honorable Barbara A. Mikulski
United States Senate

The Honorable Patty Murray
United States Senate

The Honorable Barack Obama
United States Senate

The Honorable Jack Reed
United States Senate

The Honorable Ken Salazar
United States Senate

The Honorable Charles E. Schumer
United States Senate

The Honorable Ron Wyden
United States Senate

The Honorable Darrel E. Issa
Chairman
Subcommittee on Energy and Resources
Committee on Government Reform
House of Representatives

The Honorable Carolyn B. Maloney
House of Representatives

Enclosure I

Scope and Methodology

To determine why oil and natural gas royalty revenues have not kept pace with rising oil and natural gas prices from fiscal years 2001 to 2005, we first interviewed Minerals Management Service (MMS) officials in Lakewood, Colorado. MMS presented their briefing entitled *"Management of the Nation's Natural Gas Royalty Revenues: The Department of the Interior's Response to the NY Times, February 2006."* MMS issued this document in response to an article published in *The New York Times* on January 23, 2006, that questioned why natural gas royalty revenues in 2005 did not increase at the same rate as prices increased. We reviewed extensive documentation supporting the information in MMS's presentation and agreed with the reasons MMS cited as to why natural gas royalty revenues have not kept pace with rising natural gas prices. We also generally agreed with MMS's portrayal of the impact these reasons had on royalty revenues. We also discussed with MMS officials the reasons that oil revenues had not kept pace with rising prices from 2001 to 2005.

Because summary royalty data published on MMS's Web site do not solely represent transactions that occurred during the reported fiscal year, but include transactions from previous years as well, we obtained oil and natural gas data from MMS's financial system for fiscal years 2001 and 2005.[5] We obtained data that were posted to the appropriate fiscal year, including the sum of sales values, sum of sales volumes, and sum of royalty values less allowances for each payor aggregated by product type (oil or natural gas) for transactions that consisted largely of cash royalty payments, royalty in kind, compensatory royalties, transportation allowances, natural gas processing allowances, and profitable profit-sharing arrangements. We tested these aggregate data for reasonableness because we were aware of possible data errors. We corrected a 1.19 trillion cubic-foot error in the volume of natural gas sold during fiscal year 2001. However, we did not test or validate the estimated 6 million transactions of which the 2001 and 2005 data are comprised. We have tested individual oil and natural gas transactions from MMS's financial database in the past and have found that, when transactions were aggregated to lesser levels, between 1.9 and 6.0 percent of the data was erroneous or missing.[6] We found that about 8.5 percent of the aggregated data for 2001 and 2005 that we analyzed for this report is anomalous. Anomalous data include data that are outside of a reasonable range for royalty rates, outside of a reasonable range for expected prices, contain negative or missing values for sales volumes or royalties when cash royalties are due, and consist of a positive value when allowances are reported. We then estimated the financial impact that these anomalous data had on royalties reported and sales volumes reported. Because only a small number of these anomalies exceeded 0.01 percent of the total annual royalty revenues or volumes sold, our analysis suggests that these anomalous data did not significantly impact royalty statistics reported in table 1 and

[5]Transactions from previous fiscal years are called adjustments, and they are a standard industry practice caused by, among other things, rebalancing of volumes sold and corrections to unit allocations. Fiscal years 2001 and 2005 contain adjustments only for their respective years that are current as of January 6, 2006, and exclude reported sales of nitrogen.

[6]GAO, *Mineral Revenues: Cost and Revenue Information Needed to Compare Different Approaches for Collecting Federal Oil and Gas Royalties*, GAO-04-448 (Washington, D.C.: Apr. 16, 2004), app. I.

table 2. We concluded that these data are sufficiently reliable for the broad nature of our analysis.

We decided to pursue an approach that was different from MMS's approach in quantifying the individual impact of changes in prices, volumes, and royalty rates on total royalty revenues and to assess why total royalty revenues had not kept pace with rising prices. MMS estimated the impact of these variables by determining what royalties would have been if individual variables had not declined or if specific events, like hurricanes, had not occurred. While mathematically sound, this methodology has some limitations—for instance, it does not consider that all the variables are changing over time. In addition, the sum of estimated individual changes using this methodology significantly exceeds the actual change in total royalty revenues, and this could be misinterpreted. In contrast, we estimated the effects of each individual variable on total royalty revenues by multiplying the change in that variable from 2001 to 2005 by the average values of the other variables during that period. This methodology assumes that all the variables were changing at a constant rate from 2001 to 2005. We examined the raw data and found that this assumption was generally reasonable for natural gas volumes sold, average natural gas prices, and net natural gas royalty rates, except for the average natural gas price in fiscal year 2002. It also appears to be reasonable for net oil royalty rates and average oil prices, except for fiscal year 2002. The one main exception is that the drop in oil volumes sold was not changing at a constant rate—oil volumes sold dropped substantially between 2002 and 2003 when the federal government started to transfer significant quantities of oil to the SPR. Under our methodology, nonetheless, the sum of the estimated individual impacts on total royalty revenues was close to the actual total change in royalty revenues.

Comments from the Department of the Interior

United States Department of the Interior
MINERALS MANAGEMENT SERVICE
Washington, DC 20240

JUN 02 2006

Mr. Jim Wells
Director, Natural Resources and Environment
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Wells:

Thank you for the opportunity to comment on the draft report entitled "Royalty Revenues: Total Revenues Have Not Increased at the Same Pace as Rising Oil and Natural Gas Prices due to Decreasing Production Sold," (GAO-06-786R). The Minerals Management Service (MMS) appreciates the continuing dialogue and assistance from GAO to ensure the quality and continuous improvement of our revenue management program.

The services the MMS provides have a major economic benefit to taxpayers, states, and the American Indian community. Therefore, we are dedicated to ensuring all revenues from Federal and Indian mineral leases are accurately collected and disbursed to the appropriate recipients in a timely manner.

We appreciate the thoroughness of the draft report and, while we took a different approach to this issue, are in concurrence with your conclusion: an overall decrease in volume between 2001 and 2005 offset the impact of rising prices on total royalty revenues.

If you have any questions regarding this response, please contact Mr. James Witkop, MMS's Audit Liaison Officer, at (202) 208-3236.

Sincerely,

R. M. "Johnnie" Burton
Director

Enclosure

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