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ROYALTY-IN-KIND PROGRAM

MMS Does Not
Provide Reasonable
Assurance It Receives
Its Share of Gas,
Resulting in Millions in
Forgone Revenue



GAO

Accountability * Integrity * Reliability



Highlights of [GAO-09-744](#), a report to congressional requesters

Why GAO Did This Study

Companies that develop and produce oil and gas from federal lands and waters are required to report their production volumes and other data to the Department of the Interior's (Interior) Minerals Management Service (MMS) and to pay royalties either in value (cash) or in kind (oil or gas). In fiscal year 2008, MMS estimated that it had collected more than \$2.4 billion in royalty-in-kind (RIK) gas.

It is important that MMS ensure that it receives the RIK gas to which it is entitled. The difference between the RIK gas owed—MMS's entitled percentage of gas—and the percentage it actually receives is referred to as a "gas imbalance."

GAO was asked to evaluate the extent to which MMS can provide reasonable assurance that it is accurately identifying and collecting RIK gas imbalances in a timely fashion. GAO analyzed MMS documents and data, documentation of industry standards, and interviewed MMS and industry officials.

What GAO Recommends

GAO is making seven recommendations to the Secretary of the Interior to help MMS improve the accurate and timely identification and collection of RIK gas imbalances. In commenting on this report, Interior agreed with four of GAO's recommendations and partially agreed that it should audit a sample of leases and promulgate program regulations. Interior did not agree that daily gas imbalances be monitored.

View [GAO-09-744](#) or [key components](#). For more information, contact Frank Rusco at (202) 512-3841 or ruscof@gao.gov.

ROYALTY-IN-KIND PROGRAM

MMS Does Not Provide Reasonable Assurance It Receives Its Share of Gas, Resulting in Millions in Forgone Revenue

What GAO Found

MMS is forgoing revenues for gas royalties owed to the federal government because it does not provide reasonable assurance that it accurately and promptly identifies and collects on RIK gas imbalances. GAO found that MMS is forgoing revenues for the following reasons:

- MMS estimates that it is owed a net of \$21 million for past imbalances but it lacks the information necessary to calculate the full amount of revenues due. MMS does not have sufficient data to determine whether it has received its full percentage of RIK gas. Also, MMS's estimate does not include interest on some unpaid imbalances because MMS has not determined when interest begins to accrue on imbalances, as required by law. Further, MMS monitors imbalances on a monthly, rather than daily basis, which leaves open the possibility that some companies owing RIK gas could provide less gas to MMS when gas prices are relatively high, making up the difference by providing more gas when prices are relatively low, something that could cost MMS additional revenues because it could miss the opportunity to sell gas on the days when prices are high.
- MMS does not audit gas companies' production and allocation data, therefore it cannot verify that it is receiving its entitled percentage of gas. MMS does not audit, in part, because it believes that its verification procedures are sufficient. However, other governments and gas companies routinely audit their imbalances and uncover inaccuracies that would result in lost revenues if left unchecked.
- MMS lacks adequate policies and procedures for accurately and promptly identifying and collecting gas imbalances. For instance, the agency does not know how companies allocate gas among all parties having a claim on a share of gas produced; this may affect whether MMS receives its percentage of gas on a daily basis. In addition, MMS does not compel companies to document production and deliveries in a consistent format and meet deadlines. As a result, MMS analysts spend time gathering and reformatting data instead of identifying and collecting on imbalances. MMS also allows companies to negotiate imbalances indefinitely. For example, MMS has been negotiating with a company for more than 2 years regarding a \$900,000 imbalance.
- MMS's information system does not provide accurate and timely data on RIK gas imbalances. For instance, MMS's information system cannot calculate cash settlements for imbalances or compare various types of data that companies submit. Consequently, MMS processes more than half of its gas imbalance data manually.
- MMS has been operating for many years without sufficient staff to reconcile gas imbalances, and the staff it has is not sufficiently trained. For instance, according to RIK management, MMS does not have sufficient staff to dedicate someone to fully review RIK gas analysts' work on imbalances, even though mistakes in that work often occur. MMS recently hired one new gas imbalance analyst but has not formally assessed staffing needs. In addition, RIK gas imbalance staff lack, among other things, training on industry standards on gas imbalance calculations.

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Abbreviations

COPAS	Council of Petroleum Accountants Societies
IG	Inspector General
Interior	Department of the Interior
MMBtu	million British thermal units
MMS	Minerals Management Service
OGOR	Oil and Gas Operations Report
PRA	Petroleum Registry of Alberta
RIK	Royalty-in-Kind
Treasury	Department of the Treasury

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United States Government Accountability Office
Washington, DC 20548

August 14, 2009

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

The Honorable Ron Wyden
Chairman
Subcommittee on Public Lands
and Forests
Committee on Energy and
Natural Resources
United States Senate

The Honorable Nick J. Rahall, II
Chairman
Committee on Natural Resources
House of Representatives

The Honorable Darrell Issa
Ranking Member
Committee on Oversight and
Government Reform
House of Representatives

In fiscal year 2008, the Department of the Interior's (Interior) Minerals Management Service (MMS) collected more than \$12 billion in royalties for oil and natural gas developed and produced from federal lands and waters. These royalties represent one of the country's largest nontax sources of revenue. Companies that develop and produce oil and gas resources from federal lands and waters do so under leases obtained from and administered by agencies of Interior—the Bureau of Land Management for onshore leases and MMS for offshore leases. MMS also collects, accounts for, and distributes royalties associated with oil and gas produced from leased federal lands and waters. MMS collects royalties either through its royalty-in-value program—whereby producers pay royalties in cash based on the cash value of the oil and gas produced and sold—or its royalty-in-kind (RIK) program—whereby producers pay royalties in oil or gas, and MMS in turn sells the oil or gas. In fiscal year 2008, MMS estimates it collected gas valued at more than \$2.4 billion and

oil valued at nearly \$4.2 billion through the RIK program, which is equal to more than half the royalties collected by MMS.¹ In September 2008, we reported that MMS's oversight of its RIK natural gas collections was less robust than its oversight of RIK oil collections and that the agency lacked assurance that it was collecting the RIK gas royalties it was owed.²

Given the financial importance of royalty management, MMS has been the subject of considerable scrutiny by GAO; Interior's Inspector General (IG); its own internal reviews; and the Royalty Policy Committee, a group convened in 1997 by the Secretary of the Interior and charged with advising Interior on managing federal leases and revenues. One vulnerability identified by these groups is the possibility that MMS may not receive the total amount of royalties to which it is entitled—a situation known as an “imbalance.” Interior's IG first noted this vulnerability in the RIK program in 2002. In June 2007, MMS likewise found weaknesses in its handling of RIK gas imbalances in its response to the Office of Management and Budget's Circular A-123, which defines management's responsibility for internal control in federal agencies. Based on these findings, MMS implemented an action plan to assist in the identification and timely resolution of imbalances. Further, the Royalty Policy Committee's Subcommittee on Royalty Management issued a report to the full committee in December 2007 that included more than 100 recommendations to strengthen Interior's royalty collections, including 31 directed at the RIK program. Among these recommendations, the subcommittee recommended that an RIK subcommittee be formed to address, among other things, the verification of RIK gas volumes. This subcommittee, established in April 2008, has since noted RIK gas imbalances as an issue and has stated that it will be reporting to the full committee on its findings and recommendations early in the new administration.

In light of these questions, as well as the potential financial impacts of RIK gas imbalances, you asked us to determine the extent to which MMS ensures the accurate and timely identification and collection of RIK gas

¹Included in the \$4.2 billion in oil collected was \$1.6 billion transferred from leases taken in kind to the Strategic Petroleum Reserve.

²GAO, *Oil and Gas Royalties: MMS's Oversight of Its Royalty-in-Kind Program Can Be Improved through Additional Use of Production Verification Data and Enhanced Reporting of Financial Benefits and Costs*, [GAO-08-942R](#) (Washington, D.C.: Sept. 26, 2008).

imbalances. In conducting our work, we reviewed applicable statutes and documentation of MMS policies and procedures for collecting in kind royalties. We also met with officials from MMS, gas production companies, the North American Energy Standards Board,³ and pipeline companies, as well as industry experts. To determine daily imbalances, we analyzed MMS's price and delivery volumes data, as well as pipeline production statements we received from MMS's Offshore Energy and Minerals Management division, for a nongeneralizable sample of 32 gas measurement points. We restricted our analysis to those measurement points that contained leases with the same royalty percentage because those were the only points for which we could obtain sufficient data to perform our analysis. Appendix I contains a more detailed discussion of our scope and methodology.

We conducted this performance audit between June 2008 and August 2009, 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.

Background

MMS collects gas from in kind leases under the authority of the Mineral Leasing Act of 1920, as amended, and the Outer Continental Shelf Lands Act of 1953, as amended, and is required to obtain at least fair market value for the RIK gas it sells.⁴ Prior to the mid-1990s, in kind royalties were generally limited to oil sold to small refiners that did not have an adequate supply of their own. In 1995, MMS began to study whether there were additional circumstances under which taking both oil and gas in kind was in the best interest of the federal government. According to MMS, it can often achieve greater revenues when it sells gas taken in kind because it is able to negotiate favorable transportation and processing arrangements. MMS believes in kind efforts are a means of avoiding lengthy legal disputes between MMS and industry over the value of the oil and gas produced and

³The North American Energy Standards Board serves as an industry forum for the development and promotion of standards that will lead to a seamless marketplace for wholesale and retail natural gas and electricity, as recognized by its customers, business community, participants, and regulatory entities.

⁴Energy Policy Act of 2005, Pub. L. No. 109-58, § 342.

is a way to simplify royalty administration. In addition, MMS concluded that it would not need to audit RIK sales because the agency would sell the gas rather than relying on producers to accurately report their own sales prices, as is done in the royalty-in-value program. The collecting, reporting, and auditing of cash royalty payments have been challenging for MMS because of concerns about the accuracy and reliability of production and pricing data submitted by royalty payors and because there are about 29,000 leases producing oil and gas, many with several companies paying monthly royalties. MMS began a series of pilot sales of royalty oil and gas in 1998 and, based on the results, dramatically expanded its RIK program until 2007. In 2008 and 2009, the volumes taken in kind have, and are projected to, decrease as MMS decreases the number of properties taken in kind, in part because it identified and removed properties that had lower revenues than a fair market value benchmark.

MMS is charged with ensuring that RIK oil and gas are not sold for less than market value and that revenues it receives are at least as great as the revenues it would have received had it taken the royalties in cash. To meet this requirement, MMS compares the estimated benefits of the RIK program with the estimated benefits it would have received if the royalties had been taken in cash and reports this to Congress annually. MMS estimated that from fiscal years 2004 through 2007, the RIK program generated about \$150 million more in net value to the government than MMS would have collected had it received royalties in cash. Of this \$150 million, MMS estimated that (1) \$131 million came from selling RIK oil and gas for more than MMS would have received in cash royalty payments, (2) \$8 million came from interest that accrued because revenues from RIK sales were received earlier than cash payments would have been received through the in-value program, and (3) \$11 million came from savings accrued because the RIK program costs less to administer than the royalty-in-value program.

Through the RIK gas program, companies that produce gas on federal leases owe MMS a royalty, or a percentage, of the daily gas production. To ensure that the government obtains the fair value of RIK sales, MMS must ensure that it receives the percentage of total production volumes to which it is entitled. The volume of gas a company owes to MMS is determined by the following equation:

$$\text{royalty volume} = \text{total production volume} \times \text{royalty percentage}$$

The royalty percentage for leases taken in kind varies somewhat but is currently in the range of 12.5 percent to 16.67 percent. Measuring

production and allocating a percentage of that production is relatively straightforward when one company measures its own output from a federal lease and reports its own production to MMS. However, multiple production companies sometimes combine the gas flowing from their leases at a measurement point in order to share the risks, costs, and benefits of gas production. These companies often elect from among themselves a single company—called the operator—to allocate the gas flowing from each of the companies. Due to the complex nature of the natural gas market, operators cannot always allocate each production company or royalty owner its entitled amount of gas, resulting in a situation known as an “imbalance.” Imbalances—both positive and negative—are a common occurrence for MMS and all companies in the gas industry because, among other reasons, companies must estimate the volume of gas they will produce; in turn operators allocate gas based on those estimates rather than actual production. The operator is also responsible for monitoring and reporting gas imbalances—the difference between the volume of gas owed to lease and royalty owners and the volume actually allocated. Currently, there are about 250 measurement points and 550 leases in the RIK gas program.

In its guidance to the operator, MMS requests that the operator submit monthly imbalance statements for each measurement point within 60 days of the last day of production. Imbalance statements report the total gas production at a measurement point for the month, the percentage of that production that the government is entitled to, the volume of gas delivered on behalf of MMS, and any imbalances. Additionally, MMS regulations require operators to submit monthly production reports to MMS by the 15th day of the second month following the month for which is being reported.⁵ Production reports contain a large number of data components, including total production volumes for each measurement point. MMS compares all of the data components contained in these two operator-generated reports, as well as third-party online pipeline statements indicating the amount of gas delivered to RIK gas purchasers, to confirm the accuracy of data on each of the documents. MMS considers an imbalance to be “reconciled” if the data components contained in these reports are consistent. Once MMS reconciles monthly imbalances, it determines the total cumulative imbalance by adding the most recent

⁵30 CFR 210.103. Production reports refer to form MMS-4054, also referred to as the Oil and Gas Operations Report (OGOR). The OGOR is an operator-submitted form that identifies all oil and gas lease production and dispositions. The form is used for all production reporting for offshore Outer Continental Shelf and onshore federal and Indian lands.

production month's imbalance to that of previous months. Operators "resolve" imbalances daily by either adjusting future allocated volumes or paying in cash. MMS has established a policy that those RIK gas imbalances that reach what the agency deems to be an "extraordinary" level must be resolved through a payment of cash, either to MMS if the operator has given the agency less than its entitled amount of gas or to the operator if MMS has received more than its entitled amount.⁶ Additionally, any lease that ceases to produce gas or is terminated from the RIK program is required to be settled through a cash payment for any outstanding imbalances.

MMS May Be Losing Revenue Because It Does Not Accurately and Promptly Identify and Collect on RIK Gas Imbalances

MMS risks losing millions of dollars in revenue because it does not accurately and promptly identify and collect on RIK gas imbalances. Specifically, MMS (1) estimates it is owed a net of \$21 million for gas imbalances, but it lacks the necessary information to determine the exact amounts; (2) does not audit RIK gas operators' production and allocation data, and thus cannot verify that it receives the correct volumes of RIK gas; (3) lacks adequate policies and procedures to reconcile and resolve imbalances; (4) does not have an information system that can provide accurate and timely data for reconciling and resolving imbalances; and (5) has insufficient staff and training to administer the program efficiently and effectively.

MMS Lacks Information Necessary to Quantify Revenues Due from Imbalances

MMS has made progress in reconciling RIK gas imbalances, and its current estimates value these imbalances at \$35 million owed to MMS and \$14 million that MMS owes to operators, resulting in a net of \$21 million owed to MMS.⁷ In 2007 MMS adopted an action plan to reconcile its backlog of RIK gas imbalances that occurred in 2002 through 2006. To date, MMS has reconciled most of that backlog and has established the goal of reconciling more recent imbalances within 180 days of production. RIK officials told us that, as of June 2009, the agency has completely reconciled nearly 99 percent of the imbalances from 2002 through 2006. In addition, MMS's data

⁶We are not reporting the amount of MMS's extraordinary threshold because the agency believes this will compromise its efforts to collect additional revenues associated with imbalances in a timely manner. Further, MMS determines when imbalances have reached this threshold by applying a fixed rate of \$5 per million British thermal units to volume imbalances. MMS officials said they will re-evaluate the fixed rate and the "extraordinary" level in the future.

⁷This does not include any interest associated with the value of uncollected imbalances.

indicate it has completely reconciled almost 99 percent of the imbalances for production occurring in fiscal year 2007, almost 98 percent for fiscal year 2008, and about 94 percent for fiscal year 2009.

However, MMS does not know the exact amount it is owed for imbalances because it lacks at least three types of information. First, it does not verify all gas production data to ensure it receives its entitled percentage of RIK gas from all leases taken in kind. Prior to February 2009, MMS reconciled gas imbalances through data from two operator-generated reports, imbalance statements and monthly production reports, and online third-party data from pipeline companies on the amount delivered to purchasers of RIK gas. This verified whether MMS received the volumes of gas that the operator reported, and whether that volume was the correct percentage of reported production according to operator-generated data. However, it did not verify through third-party data that the operator correctly reported the total production at each lease in the first place. Therefore, MMS could not use this method to verify that the gas allocated by operators was equal to MMS's entitled percentage of gas volumes. Recognizing this, in 2008, we recommended that MMS bolster its verification process for gas volumes owed to the government by using third-party production information, such as the data collected in the Offshore Energy and Minerals Management division's gas verification system, in addition to the third-party delivery information it had already been using.⁸ MMS's gas imbalance analysts began using the third-party data contained in the gas verification system in February 2009, but because these data only include total production at the measurement point rather than for each lease, analysts cannot use the system to verify that it was allocated the entitled percentage from each lease taken in kind.

Second, MMS lacks information on how to price gas imbalances and the point at which the agency should begin applying interest to the imbalances for leases that have terminated from the program or those leases where production has ceased. Since the RIK program first began, MMS has updated its guidance letter to operators. Although MMS's most recent guidance letter states that MMS will charge monthly interest on imbalances, past guidance letters state that interest will only be charged if the operator pays its imbalance later than 60 days after the final month the imbalance occurred. Interior is required by law to charge interest on late

⁸[GAO-08-942R](#).

payments and underpayments of royalties.⁹ Further, while MMS's current guidance letter to operators specifies that it will price imbalances according to its own contract price for the gas during the month the imbalance occurred, the previous guidance letters did not contain this language. MMS is not actively trying to collect on the imbalances of those leases that have been terminated from the program or those leases where production has ceased because there have been discussions with the Office of the Solicitor for more than a year about these issues. In a January 2008 memo, MMS asked the Office of the Solicitor for an opinion on when to charge interest and whether its current methodology to price imbalances is consistent with law. In its memo, MMS proposed the following two pricing methods, in addition to its current method:

1. Calculating the price of the imbalances based on the value applicable to the month before settling the imbalance in cash and after crediting any over-allocations existing since the first imbalance month.
2. Calculating the price using the value when the last imbalance occurred.

Recently, the Office of the Solicitor asked RIK program officials to choose the most appropriate pricing and interest methods before issuing an opinion on those methods. However, those methods have not yet been presented to the Solicitor, and MMS is currently not making additional requests for payment of imbalances for leases that have terminated from the program or those leases where production has ceased.

Finally, MMS could be forgoing revenue because it lacks information on daily gas imbalances. Section 115 of the Federal Oil and Gas Royalty Management Act, as amended, provides that a lessee's obligation does not become "due" until the end of the month following the month in which the gas is produced.¹⁰ In its guidance letter to operators, MMS requests that deliveries be made on a daily basis equal to the royalty percentage. Because the statute authorizes MMS to enforce operator obligations only on a monthly basis, MMS believes it appropriate to calculate and monitor imbalances owed solely on a monthly rather than daily basis. However, this leaves open the possibility that some companies that owe RIK gas could provide less gas to MMS on days when gas prices are relatively high,

⁹30 U.S.C. § 1721(a).

¹⁰30 U.S.C. § 1724(c)(2).

and make up the difference by providing more gas on days when prices are relatively low. Because purchasers of RIK gas bid on two components of the amount of gas produced daily—a minimum volume set at a monthly price and an additional volume, if available, at a fluctuating daily or “spot” price—MMS would lose revenue because it would miss the opportunity to sell gas on days when spot prices are higher. Because MMS reconciles imbalances on a monthly—rather than daily—basis, such an occurrence could go undetected. MMS guarantees the purchaser of RIK gas the full minimum volume on a daily basis, except in the case of operational equipment failure or natural disaster. In contrast, industry officials we spoke with said that they monitor imbalances daily to ensure their companies do not lose revenue from daily imbalances.

To investigate the extent to which MMS has been allocated its royalty percentage of RIK gas on a daily basis, we analyzed daily volumes of total production and allocation to MMS at a sample of measurement points. Because measurement points combine the gas from numerous leases that may have differing royalty percentages, it is not possible to determine whether MMS received its royalty percentage on a daily basis using MMS’s data. We therefore restricted our analysis to a random sample of the measurement points that had leases with a common royalty percentage. These points account for about 85 percent of those in the RIK gas program. On most days—74 percent of those we examined—the allocation was within 25 percent of MMS’s royalty percentage. However, on 18 percent of the days, the allocation was more than 25 percent less than MMS’s royalty percentage and on 8 percent of days the allocation was more than 25 percent greater than MMS’s royalty percentage. On average, MMS received 15.9 percent of total production when its royalty percentage was 16.67 percent.

In addition, we collected daily data on the differential between the base and spot price for our sample of measurement points and identified a small correlation between higher prices and a lower percentage allocated to MMS. We estimated that the correlation we found would result in a loss of about \$1,400 for each measurement point during a 6-month time period. Further, the common royalty percentage in the leases at the measurement points we examined—which accounts for about 85 percent of measurement points in the RIK gas program—makes it easier to detect this practice. At measurement points with a mix of different royalty percentages—about 15 percent of measurement points in the RIK gas program—there are no data available to MMS to detect this, which could encourage such behavior and result in higher revenue losses for these measurement points. See appendix II for our complete analysis.

Daily imbalances may also be costing MMS because it does not track transactions called “keepwhole payments.” MMS must make such payments if RIK gas purchasers do not receive their minimum daily volume of gas. This is because purchasers typically enter into advance contracts to resell RIK gas, and if they do not receive their expected volumes they must buy that volume elsewhere in order to fulfill these contracts. Daily gas imbalances may be triggering keepwhole payments, but MMS does not know the extent to which this occurs because it does not adequately track these payments.

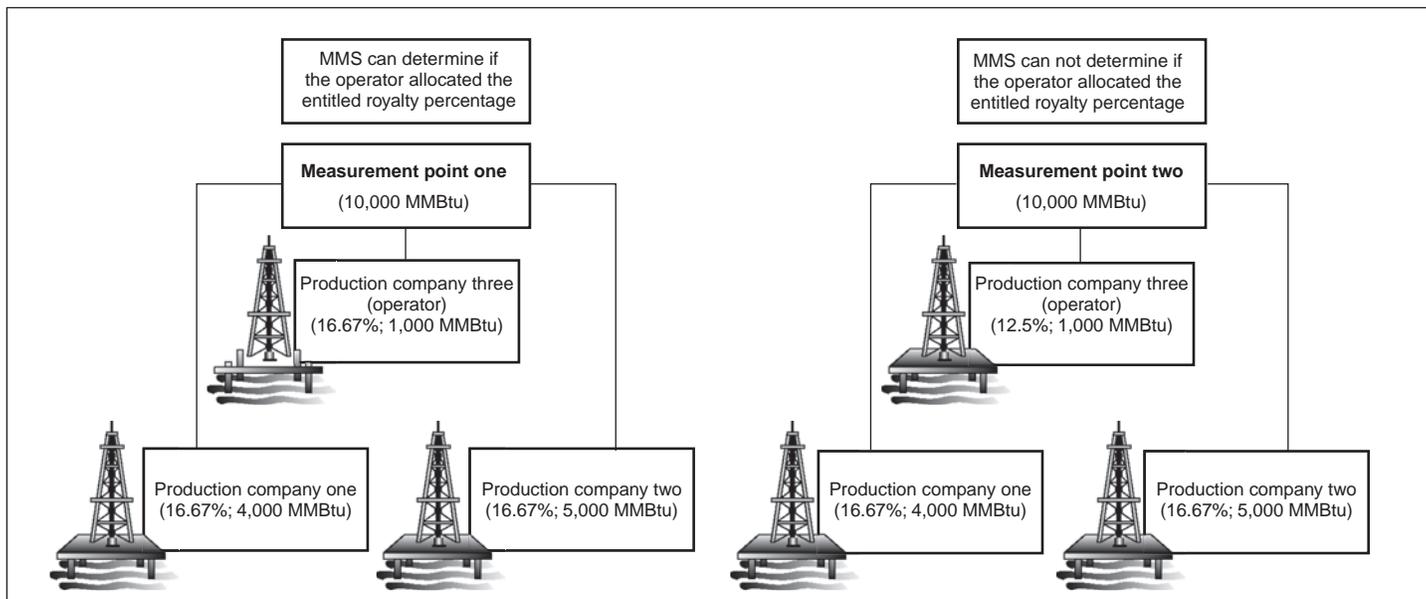
MMS Does Not Audit Operators’ Records to Verify RIK Gas Production

MMS also may be forgoing revenue because it does not audit operator data to ensure it has received its entitled royalty percentage. MMS has procedures for reconciling imbalances and uses third-party production data to verify some of the data it receives from operators. However, it has not assessed the risk of forgoing audits at those measurement points where it does not have complete data with which to verify that it has been allocated its entitled percentage of gas. Although the RIK guidance letter to operators states MMS’s right to audit operator information related to RIK gas produced and delivered, MMS has not done so because it has considered its verification of operator-generated data to be sufficient. MMS has also claimed that it has saved money as a result of not auditing and that this is a benefit of the RIK program. However, other royalty owners and members of the oil and gas industry regularly audit operator-reported data. According to an industry representative, this entails traveling to an operator’s place of business to scrutinize gas production documentation. According to an official from the Texas General Land Office—the agency responsible for administering Texas’s RIK program—state audits often find that the office has not received the gas volumes it is entitled to. Furthermore, the Council of Petroleum Accountants Societies (COPAS), a professional organization of oil and gas accountants, recommends that any royalty or working interest owner initiate an audit if an operator’s response is unsatisfactory or if a discrepancy is considered significant. Industry representatives told us that oil and gas companies regularly audit to ensure that they have received the gas they are entitled to. Representatives from one company noted that they use a risk-based approach, auditing operators who allocate large volumes of gas because there is the greatest risk of error in these cases.

Additionally, there are cases when available third-party production data do not give MMS adequate information to determine whether it has received its royalty percentage. For example, when RIK leases combined at one measurement point have different royalty percentages, MMS cannot

determine from the available gas verification system data whether it has received its entitled royalty percentage. Figure 1 illustrates this using two hypothetical measurement points. Measurement point one has three leases flowing into it, all with a royalty percentage of 16.67 percent. Regardless of whether each lease has different production volumes, MMS can calculate that it is owed 16.67 percent of the total production of 10,000 million British thermal units (MMBtu). However, measurement point two has three leases flowing into it, with two leases owing a royalty percentage of 16.67 percent and one lease owing a royalty percentage of 12.5 percent. Because each lease will have a different volume of production and third-party data from the gas verification system only includes the total production volume at the measurement point, MMS is unable to verify it was allocated its entitled percentage of RIK gas without examining the operator's production records at the lease level.

Figure 1: Two RIK Measurement Points with Common and Mixed Royalty Percentages



Source: GAO.

MMS Lacks Adequate Policies and Procedures to Reconcile and Resolve Imbalances

MMS does not have adequate policies and procedures to ensure it reconciles and resolves RIK gas imbalances efficiently. This shortcoming is apparent in three main areas.

First, MMS policies do not adequately ensure that operators allocate MMS's percentage of RIK gas. MMS's guidance letter to operators requests that operators allocate to MMS the royalty percentage of gas on a daily basis, but MMS believes it does not have the authority to enforce this guidance. Further, RIK officials said MMS does not know what method operators use to allocate gas. Indeed, our analysis shows that, contrary to its guidance letter to operators, on many days MMS is not receiving its percentage of RIK gas. This could be happening because the operator's allocation method ranks other leaseholders before MMS when allocating gas and total production is less than expected. In this instance, MMS could receive less than its royalty percentage of gas or no gas at all. According to COPAS, when the output of gas from multiple leases is combined and measured at a single measurement point, it is imperative that all parties agree on the method the operator will use to allocate the gas. We learned from industry representatives that gas companies rely extensively on such agreements to ensure they receive the gas volumes they are owed and to minimize the negative impact of imbalances on company revenues.

Second, MMS does not have adequate policies and procedures to compel operators to report imbalances promptly and in a standard format. Although the RIK gas guidance letter to operators requests that the operator provide an imbalance statement to MMS within 60 days of the month of production, the guidance is not enforceable and MMS cannot impose a penalty for failing to submit imbalance statements within that time period. To allow MMS to take enforcement actions, regulations are required. These regulations must (1) go through the public notice and comment process, and thus be transparent to the public, oversight agencies, and Congress; and (2) carry the full force of the law and hold the agency implementing the program and program participants accountable to the terms specified in the regulations. RIK officials said MMS has operated the RIK program without regulations because of the onerous nature of establishing regulations and because industry had been cooperative. More recently, RIK officials told us they have recognized that it is necessary to implement regulations for the RIK gas program in order for the agency to receive imbalance statements in a timely manner, among other reasons, and have begun drafting these regulations. In contrast, the provincial government of Alberta, Canada, has regulations in place that state a company can be fined a portion of its royalty payment if it does not submit required production data on time. Similarly, COPAS guidelines for the oil and gas industry provide that operators should submit imbalance statements to appropriate parties within 45 days of the month of production, unless other timing requirements have been agreed to. Following this guideline, gas companies we spoke with said they have

policies in place to compel timely reporting. For example, one industry agreement we obtained states that if an operator fails to submit imbalance statements for four consecutive months, the operator could be subject to auditing.

Our review of MMS's spreadsheet for tracking imbalance statements shows that, from January 2007 through June 2008, at least 35 percent of expected imbalance statements were received late and about 10 percent remain missing.¹¹ As a result, MMS analysts spend a great deal of time repeatedly calling companies to inquire about missing imbalance statements. RIK officials agreed that this was not an efficient use of resources.

MMS also does not have a policy to require operators to submit imbalance statements in a standardized or electronic format. Operators submit imbalance statements by e-mail, but the statements commonly arrive in different file formats—even from a single operator. Additionally, some operators report gas volumes in MMBtu, the measurement unit used by MMS, while others use different units of measure, such as thousand cubic feet. In these cases, MMS analysts must manually convert reported gas volumes to a uniform measurement unit—increasing the chance of calculation errors—and must spend additional time combining the information from different reports into one format, rather than focusing on reconciling imbalances. MMS could require operators to submit imbalance statements in an MMS-approved standard format.¹² In contrast to MMS, the government of Alberta requires companies to report gas volumes electronically in a standardized format and measurement unit, and these reports must pass data checks. Alberta officials have stated that standardized reporting has improved the efficiency of its RIK operations.

The third area in which MMS does not have adequate policies and procedures is in collecting payment for an imbalance from a company when a cash-out settlement between MMS and the company has not been reached. When there is an extraordinary imbalance, MMS sends the

¹¹We chose to examine only information up to June 2008 to allow some lag time for the revisions companies are permitted to make to previously submitted imbalance statements.

¹²Under the Paperwork Reduction Act, agencies may not conduct or sponsor the collection of information unless approved by the Office of Management and Budget. The Office of Management and Budget is required to determine that the agency's collection of information is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility. 44 U.S.C. § 3508.

operator an initial cash-out memo explaining the amount that MMS believes the company owes. The operator can either pay for the imbalance or dispute it by submitting evidence that the imbalance value is incorrect. To pay for the imbalance, the operator submits to MMS a royalty payment form, which indicates the company's agreement with MMS's calculation of the imbalance and classifies the imbalance as an open receivable, triggering the debt collection process with the Department of the Treasury (Treasury). The royalty payment form is the only means of triggering debt collection, but the operator would not submit this form if it disputes an imbalance. With no other bill or invoice to begin the debt collection process for disputed imbalances, MMS's practice has been to allow the exchange of supporting evidence with the operator regarding the size and value of the imbalance to continue indefinitely. In one instance, MMS sent an operator a cash-out memo in December 2006 for an imbalance valued at nearly \$900,000 and, as of February 2009, was still negotiating with the operator. In such cases, because MMS has not sent a demand letter to a company for payment, it has not referred a company to Treasury.¹³ RIK officials stated that the agency has avoided debt collection for imbalances because it is an onerous process and because it is waiting for the Office of the Solicitor to issue an opinion on the pricing and interest associated with imbalances for leases that have reached the end of their contract term. If such debts are not collected within 7 years, the statute of limitations renders them uncollectible.¹⁴

In contrast, MMS has debt collection policies and procedures in place to collect debt from companies that have purchased and received RIK gas from MMS but have not submitted payment for their purchase. According to MMS policy, a company purchasing RIK gas receives an invoice, which triggers the debt collection process. If the company does not pay within the agreed time frame, MMS issues a demand letter for payment. If the amount due MMS is still unpaid after 180 days, the issue is referred to Treasury.

MMS's Information System Does Not Provide Accurate and Timely Data

MMS's information system does not provide accurate and timely data on RIK gas imbalances, which reduces the agency's ability to collect on these imbalances. In 2003, MMS acquired a commercial, off-the-shelf software product and a custom-built database for the RIK program. The purpose

¹³Outstanding debts are referred to Treasury as required by the Debt Collection Improvement Act of 1996, Pub. L. No. 104-134 (1996).

¹⁴30 U.S.C. § 1724(b).

was to integrate all of the program's information needs in a single database where it could monitor and track gross gas production, imbalance statement data, gas deliveries, and monthly and cumulative gas imbalances. However, the information system is not capable of providing accurate and timely information on RIK gas imbalances. For instance, MMS's RIK Deputy Program Manager told us that the system cannot provide accurate information on the number and amount of keepwhole payments MMS has made and cannot calculate RIK cash-out imbalances. Therefore, as of June 2009, MMS was entering data manually into a spreadsheet and performing calculations based on the manually entered data. MMS officials further told us that gas imbalance information systems cannot analyze data from the operator-submitted imbalance statements, operator-submitted monthly production reports, and MMS's gas verification system to calculate gas imbalances. As a consequence, more than half of MMS's gas imbalance work, according to the RIK gas imbalance manager, is currently done manually. For example, two employees spend a portion of their time logging information from operator-submitted imbalance statements onto spreadsheets after which gas imbalance analysts manually upload imbalance statement data into MMS's information system. An RIK manager said the manual processing of RIK gas imbalance data has put a considerable burden on the RIK gas imbalance staff.

According to GAO's Standards for Internal Control in the Federal Government, transactions from initiation to completion should be promptly recorded to maintain their relevance and value to management in controlling operations and making decisions. Similarly, according to Interior's Internal Controls Handbook, accurate and timely information is essential for assuring the safeguarding of assets from waste, loss, unauthorized use, or misappropriation, as well as to assure compliance with laws and regulations. In its December 2007 report on mineral revenue collection,¹⁵ MMS's Royalty Policy Committee recommended the electronic submission of all offshore production records to improve MMS's compliance and enforcement activities. According to RIK officials, the committee's recommendation was not specifically directed at, and therefore did not pertain to, the RIK program. Yet RIK program managers also told us that they recognized as early as August 2007 that the system

¹⁵Royalty Policy Committee, Subcommittee on Royalty Management, *Mineral Revenue Collection from Federal and Indian Lands and the Outer Continental Shelf* (Dec. 17, 2007).

needed improvements. According to the RIK gas imbalance manager, when MMS alerted the software manufacturer to these problems, there was a disagreement as to whether the manufacturer or the support services contractor were responsible. In July 2008, MMS contracted with the software manufacturer for support services, but this system is still not meeting MMS's needs.

At the time of our review, MMS had planned to enhance the system but was also exploring the possibility of acquiring a new information management system. According to RIK officials, one candidate system was the Petroleum Registry of Alberta (PRA), which the government of Alberta uses to manage its RIK program. PRA differs from MMS's current system in several aspects. PRA was jointly developed by government and industry, with the government providing about 73 percent of the \$35 million budget. According to Alberta officials and the provincial government Web site, PRA improves compatibility by serving as the system of record for both government and industry.¹⁶ In addition, companies participating in the Alberta RIK program are responsible for promptly entering accurate production data electronically. If a company does not enter accurate production data into PRA on time, one MMS RIK official told us, PRA will alert Alberta officials regarding the issue and the company can be fined. This official added that an automated system such as the PRA would have to be customized to fit MMS's needs at some unknown cost, but that it could save RIK gas imbalance analysts' hours of time currently spent e-mailing and calling companies to submit their operator imbalance statements. According to MMS officials, they have decided not to pursue PRA in part because customization could cause issues with future upgrades and fixes, regulation would be required for MMS to require online and standardized reporting, and the system would require significant buy-in from industry. RIK program managers told us that, although they believe that a better information system would immensely improve RIK gas imbalance work, MMS does not have a timeline to acquire a more effective system.

Insufficient Staff and Training Remains a Long-Standing Issue

The RIK gas imbalance office, according to various MMS reports, has been operating without sufficient staff and training to efficiently and effectively carry out its assigned duties. As a result, certain tasks—such as gas

¹⁶PRA was developed based upon the recommendations of a task force composed of government and industry representatives including, individuals from Amoco Canada Petroleum Ltd., Shell Canada Limited, and Gulf Canada Resources Ltd.

balancing work—have not received sufficient attention, leading to the development of a backlog of RIK gas imbalances. Effective management of an organization’s human capital—its employees, as well as their skills and training—is essential to achieving results and an important part of a program’s internal controls. Human capital has been a long-standing problem for the RIK gas program. Specifically, each of the following reports found that RIK human capital needed improvement.

- A January 2001 MMS report indicated that the RIK organizational structure would need to evolve to fully support the RIK operational activity.¹⁷ The report also stated that the future RIK activity would require MMS staff training in handling imbalances, as well as several other areas.
- A September 2003 report prepared by an MMS contractor noted that, in order to support a permanent RIK program of significant scale, specific personnel requirements should be identified and filled for all RIK personnel.¹⁸
- A May 2004 MMS report noted that enhancements to human resource capabilities would be necessary in order to meet the objectives of MMS’s RIK business plan.¹⁹ Therefore, the report indicated that specific skill sets and expertise should be acquired or developed in-house by March 2006.

These human capital deficiencies continue to be a problem for the RIK gas program. For example, an RIK manager told us that, although mistakes can occur in gas imbalance calculations, MMS does not have enough staff to dedicate someone to review this work. However, beginning in November 2008, MMS began reviewing a sample of this work. In addition, according to internal MMS e-mails and our discussions with managers, RIK gas imbalance personnel have received training in oil and gas revenue accounting but managers noted that personnel need additional training in seven different courses, especially a course on industry standards on gas imbalance calculations and a communication skills course for dealing with

¹⁷Department of the Interior, Minerals Management Service, *Implementing Royalty in Kind Business Processes and Support Systems: Road Map to the Future* (Washington, D.C., January 2001).

¹⁸Lukens Energy Group, *Assessment of the Federal Royalty-in-Kind (“RIK”) Program and Development of RIK Business Plan* (September 2003).

¹⁹Department of the Interior, Minerals Management Service, *Five Year Royalty In Kind Business Plan* (Washington, D.C., May 2004).

external customers. Our review of employee training records showed, however, that RIK gas imbalance personnel received training in neither of these two courses and only about half of all the training identified. According to the MMS RIK gas imbalance manager, the training employees have received is sufficient given their workload dealing with gas imbalance improvement actions and current duties.

According to GAO's Standards for Internal Control in the Federal Government, operational success is dependent on assigning the right personnel for the job and providing them with adequate training and tools. Similarly, according to Interior's Internal Controls Handbook, in order to eliminate or reduce financial reporting risks, an organization should have, among other things, sufficient resources to perform the various job functions and should provide staff with technical and ethical training.

To MMS's credit, it recognizes that human capital issues remain. MMS is in the process of taking four additional actions. Specifically:

- In October 2008, MMS reinstated, after a 15-year absence, the requirement that each employee have an individual development plan by the end of November 2008.²⁰ These plans, according to MMS's RIK training director, were developed by supervisors sitting down with their employees and informally discussing their training needs. However, the federal government's Office of Personnel Management's 2001 Training Needs Assessment Handbook suggests that agencies use training provided to employees in other organizations as a source of assessing their staff's training needs. MMS officials told us they did not do so in developing individual development plans.
- In February 2009, MMS hired, after several months of effort, seven additional RIK imbalance and invoicing personnel, including one gas imbalance analyst. According to RIK officials, management arrived at the decision to hire seven additional staff based on an internal discussion and without a formal analysis. However, in our 2002 primer on good human capital management practices, we noted that high-performing organizations should conduct a staffing needs analysis to determine the

²⁰An individual development plan is a tool used by an employee and supervisor to forecast, identify, and schedule individual training and development opportunities to meet mission, organizational, and individual requirements.

appropriate number of employees needed to perform an organization's work.²¹ MMS has not conducted such an analysis.

- As of March 2009, MMS was in the process of entering into a 6-month contract for an assessment of the organization of RIK invoicing and imbalance work, procedures, and processes. Included in the tasks to be performed under this contract is determining whether: (1) staffing levels are sufficient to meet current and anticipated future workloads and (2) staffing levels, skill sets, education, and experience are comparable to industry. As of June 2009, this contracting effort was still ongoing and the results from that effort were not available to include in our review.
- Lastly, at our suggestion during the course of our review, MMS is reviewing the possibility of enrolling some of its employees in training classes offered by oil and gas companies to their employees participating in the RIK gas program. In offering this suggestion, we pointed out that MMS employees could (1) gain first hand knowledge into how industry does its gas imbalance work, (2) make strategic contact with industry gas imbalance employee counterparts, and (3) gain some insight into industry training requirements. With regard to the latter, whereas COPAS requires its oil and gas accounting members to receive 10 hours of continuing education annually, MMS officials told us that its RIK gas revenue specialists are not required to meet any annual education requirements. As of June 2009, MMS had not decided whether to use this industry training.

Conclusions

Although Interior has made efforts to improve its management of royalties, continuing problems with identifying and collecting RIK gas imbalances have led to forgone revenues and uncertainty about how much gas the government is owed. While MMS has made recent progress in establishing policies and procedures for charging interest on imbalances owed the government, these policies and procedures are incomplete and are leading to forgone revenues. In particular, the agency is not actively pursuing collection of past imbalances or associated interest. Further, daily gas imbalances are common and can lead to forgone revenue for the government, because they can trigger keepwhole payments made to buyers of RIK gas or because an operator could strategically deliver more gas when prices are low and less when prices are high. MMS requests that these operators allocate MMS its percentage of royalties on a daily basis,

²¹GAO, *A Model of Strategic Human Capital Management*, [GAO-02-373SP](#) (Washington, D.C.: Mar. 15, 2002).

but MMS does not monitor daily gas imbalances and, does not believe it could enforce such an allocation under existing authority. In addition, despite the fact that audits are commonplace in the gas industry, MMS has not employed audits in the RIK program, and thus cannot ensure that it is receiving its entitled percentage of gas. MMS also operates without key regulations that define how operators submit imbalance statements and how operators are to allocate gas owed the government. The absence of such regulations has led to a system in which imbalance statements are not submitted in a standardized format or in a timely fashion and in which MMS has no authority to require an allocation system that is beneficial to the government. In addition, MMS is operating without procedures that define reasonable deadlines for resolving and collecting gas imbalances, and as a result, some imbalances have remained uncollected for years. And because MMS lacks an adequate information system that could receive relevant information electronically and effectively identify and resolve gas imbalances, MMS staff often must manage data manually or operate without appropriate internal controls for data management. Finally, MMS has been operating without sufficient workforce analysis and planning, and as a result, training for MMS staff is not clearly aligned with agency needs or benchmarked against training of their counterparts in gas companies participating in the RIK program.

Recommendations for Executive Action

To improve the Minerals Management Service's oversight of the RIK gas program and help ensure that the nation receives its fair share of RIK gas, we recommend that the Secretary of the Interior direct the Minerals Management Service to take the following seven actions:

- Complete establishing policies and procedures to ensure outstanding imbalances are valued appropriately and that the correct amount of interest is charged.
- Monitor daily gas imbalances to determine whether the allocation practices of gas operators are resulting in lost revenues to MMS. To the extent that this is occurring, identify and propose specific legislative changes that MMS believes are needed to require operators to deliver MMS's royalty percentage on a daily basis.
- Audit the operators and imbalance data of a sample of leases taken in kind and, on the basis of the audit findings, establish a risk-based auditing program for RIK properties.

-
- Promulgate RIK program regulations that protect the federal government's interests. At a minimum, regulations should require operators to submit imbalance statements in a standardized format within 60 days following the month of RIK production. They should also require the use of gas allocation methods MMS deems will ensure a fair return to the government.
 - Establish procedures, with reasonable deadlines, for resolving and collecting all RIK gas imbalances in a timely manner.
 - Determine the information system enhancements necessary to effectively identify and resolve gas imbalances and put into practice such a system.
 - Conduct an RIK staffing and training needs analysis and put into place a corresponding staffing and training program for MMS staff.

Agency Comments and Our Evaluation

We provided a draft of this report to Interior for review and comment. Interior generally agreed with our findings and concurred with four of our recommendations, partially concurred with two of our recommendations, and did not concur with one recommendation.

Specifically, Interior concurred with our recommendations to: (1) complete establishing policies and procedures to ensure outstanding imbalances are valued appropriately and that the correct amount of interest is charged; (2) establish procedures, with reasonable deadlines, for resolving and collecting all RIK gas imbalances in a timely manner; (3) determine the information system enhancements necessary to effectively identify and resolve gas imbalances and put into practice such a system; and (4) conduct an RIK staffing and training needs analysis and put into place a corresponding staffing and training program for MMS staff.

Interior partially concurred with our recommendation to audit operators and imbalance data of a sample of leases taken in kind and, on the basis of these findings, establish a risk-based auditing program. Interior stated that it would conduct an analysis of the benefits of conducting risk-based audits on a sample of leases. While we believe this is an important first step, we continue to believe it is important to conduct audits of a sample of leases taken in kind. Although MMS's verification processes may uncover some discrepancies between their entitled percentage and the volumes delivered, we have shown that in some instances MMS's verification processes are not sufficient to uncover discrepancies. Further,

industry and other RIK programs audit to ensure they receive their entitled royalties.

Interior also partially concurred with our recommendation to promulgate RIK program regulations that protect the federal government's interest and, at a minimum, require operators to submit imbalance statements in a standardized format, within 60 days following the month of production, and require the use of gas allocation methods MMS deems will ensure a fair return to the government. Interior stated that the drafting of regulations addressing the operator's obligation to deliver, report, and account for production and to resolve or mitigate production imbalances is well underway, which we commend. MMS stated that it will evaluate whether it should require operators to submit imbalance statements in a standardized format. We continue to believe that requiring operators to submit standardized imbalance statements would allow MMS's gas imbalance analysts to devote more time to reconciling imbalances and would reduce the chance of calculation errors. MMS also stated that it will evaluate whether to require operators to use gas allocation methods. While we believe this is a positive first step, we continue to believe that the use of allocation methods will minimize the negative impact of imbalances on revenues by ensuring MMS receives the gas volumes it is owed.

Interior did not concur with our recommendation to monitor daily gas imbalances to determine whether the allocation practices of gas operators are resulting in lost revenue to MMS. Interior's letter states that the agency believes the operator's obligation to deliver MMS's royalty percentage should be the same whether royalties are paid in kind or in value. However, the in-kind program is different from the in-value program in that MMS has an obligation to provide RIK gas to purchasers on a daily basis. Therefore, in order to provide reasonable assurance that the government is receiving its fair volumes of gas and in turn meeting its obligations to RIK gas purchasers, receipt of RIK gas volumes from operators should be monitored on a daily basis. While we acknowledge in our report that the law authorizes MMS to enforce operator obligations only on a monthly basis, this leaves open the possibility that operators may provide less to MMS on days when gas prices are relatively high, and make up that difference by providing additional gas when prices are relatively low. Further, we found that industry monitors imbalances on a daily basis to ensure they do not lose revenue. For these reasons, we continue to believe that MMS should begin to monitor imbalances daily and, to the extent that lost revenues are occurring, propose legislative changes requiring operators to deliver MMS the royalty percentage on a daily basis.

Interior's full letter commenting on the draft report is reprinted in appendix III. In addition, Interior made technical comments, which we have addressed as appropriate.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to interested congressional committees, the Secretary of the Interior, and other interested parties. The report will be available at no charge on the GAO Web Site at <http://www.gao.gov>.

If you or your staffs have any questions about this report, please contact me at (202) 512-3841 or ruscof@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 report are listed in appendix IV.



Frank Rusco
Director, Natural Resources and Environment

Appendix I: Scope and Methodology

We were asked to determine the extent to which MMS ensures the accurate and timely identification and collection of royalty-in-kind (RIK) gas imbalances. To address our objective, we reviewed various reports by the Department of the Interior (Interior) and Interior's Minerals Management Service (MMS) on the history and current status of imbalances associated with the RIK gas program including: (1) a 2002 internal MMS assessment of RIK gas imbalances; (2) a 2002 report by Interior's Office of Inspector General, which discussed, in part, MMS's vulnerability to underreporting of gas receipts due to RIK gas imbalances;¹ (3) MMS's monthly action plan on RIK imbalances and open receivables, first prepared in August 2007; and (4) MMS's periodic cumulative imbalance, cash-out, and keepwhole summary statements.

We also reviewed various reports prepared on the direction and overall performance of the RIK program, including (1) an examination of a 2001 MMS report which outlined MMS's future plans for the RIK program; (2) a 2003 MMS contractor report that assessed the RIK program; (3) a 2007 report by the Subcommittee on Royalty Management, part of the Royalty Policy Committee, which reviewed the operations of the RIK program;² (4) a 2008 MMS internal review report on RIK processes; and (5) a 2008 interim report by the Royalty in Kind Subcommittee, also part of the Royalty Policy Committee, which examined various issues, including imbalances, associated with the RIK program. We also examined various reports prepared by other governmental entities—including the Alberta, Canada government and the Texas state government—regarding their RIK programs. We further discussed the issue of RIK imbalances with officials from MMS, gas production companies, gas operators, industry experts, and pipelines.

To examine MMS's management of RIK gas imbalances, we received a detailed walk-through of MMS's processes for reconciling RIK gas imbalances. We reviewed a variety of MMS documentation including (1) MMS procedures manuals, (2) correspondence between MMS and Interior's Office of the Solicitor on RIK legal requirements, and (3) MMS's guidance letters to operators of RIK gas leases. We also reviewed federal and Interior's internal

¹Department of the Interior, Office of the Inspector General. *Evaluation of Vulnerabilities to Underreporting: Royalty-in-Value versus Royalty-in-Kind*, 2002-I-0044 (Washington, D.C., September 2002).

²The Subcommittee on Royalty Management. *Report to the Royalty Policy Committee: Mineral Revenue Collection from Federal and Indian Lands and the Outer Continental Shelf*, (Washington, D.C., Dec. 17, 2007).

control and management standards and policies, including: (1) GAO's Standards for Internal Control in the Federal Government,³ (2) Interior's Internal Controls Handbook, (3) MMS's Training Needs Assessment Process, (4) the Office of Personnel Management's Training Policy and Training Needs Assessment Handbooks, (5) Office of Management and Budget's Circular A-130 on management of federal information resources, (6) Office of Management and Budget's Circular A-123 on management's responsibility for internal control in federal agencies, and (7) the Information Technology Resources Board's 1999 lessons-learned report on acquiring commercial-off-the-shelf software. Further, we reviewed various documents issued by the Council of Petroleum Accountants Societies such as its 1993 report on oil and gas operator and producer roles and responsibilities and its 2001 report on producer gas imbalances, and information generated by the North American Energy Standards Board.⁴ In addition to reviewing documentation, we also conducted interviews with MMS officials; gas production companies; purchasers of MMS's RIK gas; the North American Energy Standards Board; pipeline companies; and industry experts. Lastly, we reviewed legislation pertinent to MMS's management of the RIK gas program and RIK gas imbalances. This included the Mineral Leasing Act of 1920, as amended; the Outer Continental Shelf Lands Act of 1953, as amended; and the Debt Collection Improvement Act of 1996, as amended.

Appendix II contains information on the scope and methodology we used to analyze the relationship between gas prices and the daily percentage of gas production allocated to MMS and the effect of this relationship on federal revenue.

We conducted this performance audit from June 2008 to August 2009, 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

³GAO, *Standards for Internal Control in the Federal Government*, [GAO/AIMD-00-21.3.1](#) (Washington, D.C.: November 1999).

⁴The Council of Petroleum Accountants Societies (COPAS) is a professional organization comprised of oil and gas industry accountants. COPAS committees produce accounting guidelines, interpretations, best practices, and training and reference publications used by the energy industry. The North American Energy Standards Board serves as an industry forum for the development and promotion of wholesale and retail natural gas and electricity standards.

obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Analysis of the Relationship between Price and Percentage of Gas Production Allocated to MMS and the Effect on Federal Revenue

To ensure that the government obtains a fair value for the RIK gas it sells, the Department of the Interior's Minerals Management Service (MMS) must ensure that it receives the volumes of gas to which it is entitled. The difference between the RIK gas owed—MMS's entitled percentage of gas—and the percentage of gas it actually receives is referred to as an "imbalance." As discussed in the body of this report, MMS attempts to reconcile gas imbalances monthly.

The nature of gas production causes some daily variation in volume. For example, companies must estimate the volume of gas they will produce on any given day and determine allocations based on these estimates. If actual allocation volumes differ from the estimated volumes, MMS may receive either an under-delivery of gas or an over-delivery of gas. Daily imbalances may be resolved through a subsequent day's under- or over-delivery, resulting in further variation in volume; however, MMS risks losing revenue if that variation is associated with a variance in price. Specifically, if operators allocate less than the royalty percentage of gas to MMS on days when the spot price is high and more than the royalty percentage of gas on days when the spot price is low, they could still meet the royalty percentage across the month. However, if this occurs, MMS may lose revenue because it may miss opportunities to sell the gas at the higher price, even if no long-term imbalances accumulate.

This appendix describes our analysis of the relationship between prices and the percentage of gas allocated to MMS, and how it affects the revenue that MMS receives. Specifically, it (1) explains, in mathematical terms, the potential for lost revenue if the operators allocate less than the royalty percentages of gas when the spot price is high; (2) describes the data that we used to empirically examine the daily variation in percentage of gas allocated to MMS; (3) describes the methodology and results of our analysis of daily variation in percentages of gas allocated to MMS; (4) describes the methodology and results of our analysis of the relationship between the daily variation in percentage of gas allocated to MMS and gas prices; and (5) describes the methodology and results of our analysis of the potential amounts of lost revenue.

Potential for Lost Revenue

To explain, in mathematical terms, the potential for lost revenue if operators allocate less than the royalty percentages of gas when the spot price is high, we examined how this relationship affects the expected, or average, return for an MMS lease.

**Appendix II: Analysis of the Relationship
between Price and Percentage of Gas
Production Allocated to MMS and the Effect
on Federal Revenue**

The royalties that MMS are owed can be expressed as follows:

$$\text{royalty volume} = \text{total production volume} \times \text{royalty percentage}$$

On a daily basis, the royalty volume can be expressed by the product of the daily gas production and the daily volume of gas allocated to MMS:

$$(1) RV_t = Vol_t \times A_t$$

where RV_t is the royalty volume at time t , Vol_t is the volume of gas allocated to MMS at time t , and A_t is the royalty percentage at time t . In equation (1), and the equations that follow, t stands for any given day. The monetary value of the gas allocated to MMS can then be expressed by multiplying the royalty volume and the gas spot price at the time of delivery.

$$(2) Rev_t = P_t \times RV_t$$

Substituting equation (1) into equation (2) results in the following formula:

$$(3) Rev_t = P_t \times Vol_t \times A_t$$

where the revenue MMS receives is the product of the price, volume, and royalty percentage at that time.

To determine how different levels of covariance affect the average revenue, we determined the expectation, as shown in equation (4).

$$(4) E(Rev_t) = E(P_t \times Vol_t \times A_t)$$

Because the focus of our analysis was the effect of daily variances in gas allocated to MMS that was associated with variances in the spot price, we assumed that the volume at the time of delivery is independent of the product of price and the royalty percentage, and that the volume is constant over the period.

$$(5) E(Rev_t) = E(Vol_t) \times (E(P_t)E(A_t) + Cov(P_t, A_t))$$

If higher prices tend to correspond with higher percentages of gas allocated to MMS, then the covariance term $Cov(P_t, A_t)$ will be positive, and the expected revenue will be higher. However, if high prices correspond with lower percentage of gas allocated to MMS, then the covariance term will be negative, and the expected revenue will fall.

The covariance describes both the relationship between the variables and the absolute variability of each. A substitute for the covariance would be to introduce the correlation coefficient. The correlation coefficient captures only the relationship between the variables and takes a value between negative 1 and 1. A correlation coefficient of zero would indicate that there was no relationship between the variables. A correlation coefficient close to 1 would indicate a strong positive relationship, while a correlation coefficient close to negative 1 would indicate a strong negative relationship. Using the correlation coefficient, an alternate expression for the equation (5) would be the following:¹

$$(6) E(\text{Rev}_t) = E(\text{Vol}_t) \times (E(P_t)E(A_t) + \text{Corr}(P_t, A_t) \times \text{SD}(P_t) \times \text{SD}(A_t))$$

From equation (6), it is apparent that, all things being equal, the more the price and percentage of gas allocated to MMS are negatively correlated, the greater the loss in revenue. However, the size of the effect is scaled by the absolute variability in each, $\text{SD}(P_t)$ and $\text{SD}(A_t)$.²

Data We Used for Our Analyses

To investigate the extent to which MMS receives its daily percentage of RIK gas, consistent with equation (6) above, we analyzed daily volumes of total production and allocation to MMS at a sample of measurement points. Specifically, we collected data from three sources:

- *Price data:* We collected price data from MMS's Entegrate database, which a contractor updates daily with prices from published sources. The daily price of the natural gas the operator delivers is made up of two components—the base price and the spot price. The base price is the price applied to the baseload of gas, or the amount of natural gas the operator allocates to MMS over a given period of time at a steady rate unless an adverse or “force majeure” action occurs. The base price remains the same throughout the month and is set at the beginning of every month based on the first-of-month price published in *Inside FERC*, a monthly gas market report.³ The spot price is the price applied to the swing volume of gas, or

¹Noting that $\text{corr}(X, Y) = \text{cov}(X, Y) / \text{SD}(X)\text{SD}(Y)$.

²An analogous argument could be made with respect to swings in percentage of gas allocated to MMS with respect to volume: $E(\text{Rev}_t) = E(P_t) \times (E(V_t)E(A_t) + \text{Corr}(V_t, A_t) \times \text{SD}(V_t) \times \text{SD}(A_t))$. Therefore, if high volumes correspond to lower royalty percentages, then the covariance term will be negative and the expected revenue will fall.

³*Inside FERC* is a gas market report that is published by Platts, a division of The McGraw-Hill Companies, which is a leading global provider of energy and commodities information.

the supply of natural gas that is last to be taken and first to be curtailed and absorbs production variations. The spot price varies daily.

- *Delivery data:* We collected delivery data from MMS's Entegrate database. MMS downloads final delivery volumes from the electronic bulletin boards for regulated pipelines, or it receives delivery volumes from either operator or purchaser pipeline statements, or both. MMS enters the actual volumes into the Entegrate database monthly.
- *Volume data:* We collected volume data from the Offshore Energy and Minerals Management division of MMS, which collects hardcopy pipeline statements. MMS provided copies of the pipeline statements, which a contractor keypunched. We checked the keypunched data, and found no errors. We then matched the daily production volume data to the daily price and delivery data for use in our analyses.

Because pipeline statements do not report production volume at the lease level, we could not analyze allocation percentages at the lease level. For all three sources, we collected data at the level of the measurement point—the metered point at which gas is measured. A measurement point may combine the gas flowing from numerous leases.

In addition, we excluded from our sample measurement points whose leases had differing royalty percentages. For cases in which the measurement points had differing royalty percentages, it would not have been possible to calculate whether MMS was allocated its share of gas. For example, in figure 1, measurement point one has three leases flowing into it, all with the same royalty percentage of 16.67 percent. Therefore, regardless of whether each lease has different production volumes, MMS can calculate that it is owed 16.67 percent of the total production of 10,000 MMBtu. However, measurement point two has three leases flowing into it, with two leases owing a royalty percentage of 16.67 percent and one lease owing a royalty percentage of 12.5 percent. Because each lease will likely have a different volume of production and MMS will only have the total production volume available from third party data, it is unable to determine its entitled volume of RIK gas.

Because of this limitation, we restricted our analysis to a random sample of those measurement points that had leases with a common royalty percentage. Then, for each of the randomly selected 32 measurement points, we obtained 6 months of daily observations—October 2007 through March 2008—resulting in 5,856 daily observations. MMS officials suggested that we use this 6 month time period in order to avoid hurricane

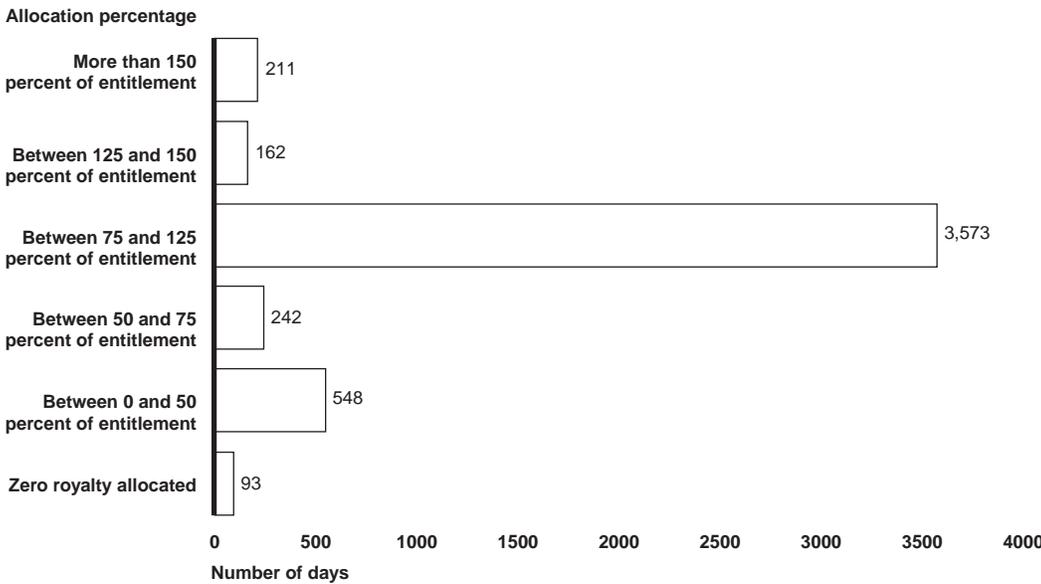
season, which typically occurs during the summer months, but gas prices during these months may differ from those included in our time period. However, 677 days had no production, and data for 366 days was missing values for allocation volumes to MMS. Because we could not produce a percentage of gas allocated to MMS in those cases, our ultimate sample contained 4,829 daily observations with values for volume of gas allocated to MMS and the differential between spot and base price and 31 measurement points.

Methodology and Results of Our Analysis of Daily Variation in Percentages of Gas Allocated to MMS

To determine the extent to which the daily percentage of gas allocated to MMS deviated from its royalty percentage of gas for the measurement points in our sample, we calculated the daily percentage of gas allocated to MMS by dividing the volume of gas allocated to MMS from that measurement point on a given day by the volume of gas produced at the measurement point. We then counted the days that the percentage of gas allocated to MMS differed from the prescribed amount of 16.67 percent by a substantial amount, which we defined as more than 25 percentage points.

Our analysis of daily data found variation in the percentage of gas allocated to MMS; however, on the majority of days, the allocation did not substantially differ from MMS's royalty allocation, as shown in Figure 2. Specifically, 3,573 of the 4,829 days—about 74 percent—had an allocation that was between 75 and 125 percent of the entitled royalty percentage of one-sixth or 0.167. But on many days, the royalty percentage of gas allocated to MMS was much less or much greater. For example, on 883 days—about 18 percent of the total, shown as the sum of the bottom three bars on figure 2—the royalty percentage of gas allocated to MMS was less than 75 percent of the prescribed amount. On the other hand, on 373 days—about 8 percent of the total, shown in the top two bars—more than 125 percent of the royalty percentage of gas allocated to MMS. On average MMS received 15.9 percent.

Figure 2: Variation in the Daily Royalty Percentage of Gas Allocated to MMS



Source: GAO analysis of MMS data.

Methodology and Results of Our Analysis of the Relationship between the Daily Variation in the Percentage of Gas Allocated to MMS and Gas Prices

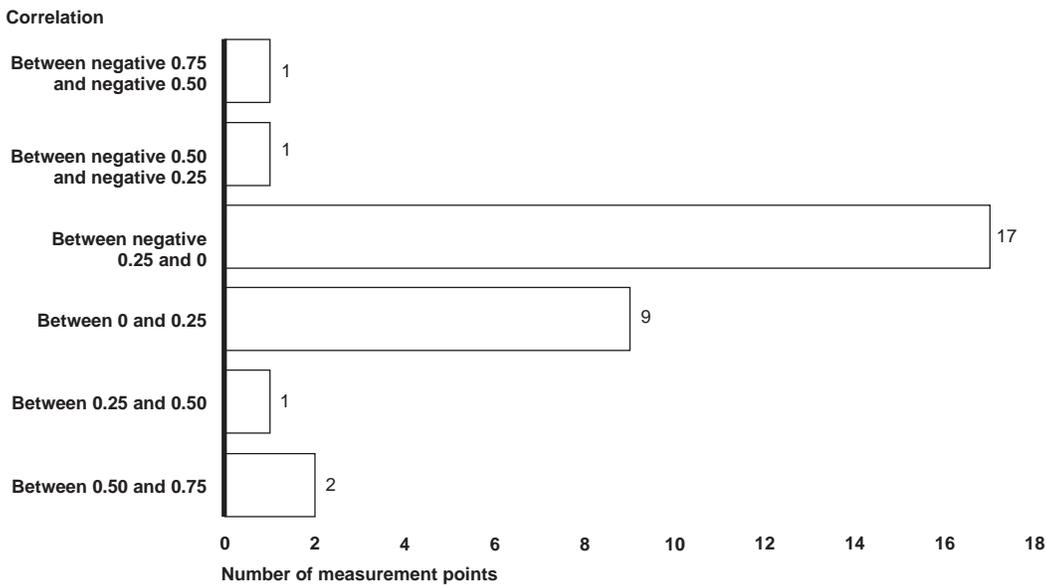
While there may be inherent daily variation in the percentage of gas allocated to MMS, the loss of revenue is determined by the extent to which that variation is associated with price. To analyze whether the percentage of gas allocated to MMS varies with price, we used the daily data on the differential between the base and spot price for our sample of measurement points and measured the correlation between these two variables for each measurement point. We found a small negative average and median correlation between higher prices and a lower percentage of gas allocated to MMS. Specifically, the average correlation was negative 0.014, while the median was negative 0.038.

Although the average was slightly negative, we found that correlations had a wide range. Figure 3 presents the frequency of the correlations of the differential between spot price and base price and percentage of gas allocated to MMS for the 31 measurement points in our sample. The maximum, or the most positive, correlation in our sample was 0.645. The minimum, or most negative, was negative 0.560. As figure 3 shows, the vast

**Appendix II: Analysis of the Relationship
between Price and Percentage of Gas
Production Allocated to MMS and the Effect
on Federal Revenue**

majority of measurement points had a correlation between negative 0.25 and 0.25.⁴

Figure 3: Frequency of the Correlations of the Measurement Points in Our Sample



Source: GAO analysis of MMS data.

⁴In its technical comments, MMS agreed that an average correlation of negative 0.014 and a median correlation of negative 0.038 indicate a “small” relationship between higher prices and lower percentages of gas allocated to MMS. However, it is important to note that we found a wide range of variability in the correlations of our sample.

Methodology and Results of Our Analysis of Potential Amount of Lost Revenue

The potential amount of lost revenue depends on the size and variability of the percentage of gas allocated to MMS, gas produced, and the spot-minus-base differential. To estimate the revenue loss that would be associated with a certain correlation, we used an hypothetical measurement point that had the same average characteristics as the ones in our sample.⁵ We then generated data that had the same average mean and standard deviation as our hypothetical example, but different correlations between the variables. We computed the average revenue for that hypothetical measurement point during a 6-month time period. We used a wide range of correlations, including the median value found in the above example. Finally, we compared the revenue to a baseline of zero correlation.

We estimate that the median correlation we found would result in a revenue loss of about \$1,400 for each measurement point during a 6-month time period, as shown in table 1. Each row of the table is the result of one million simulations of data with the given correlation and the mean and average standard deviation of the measurement points in our sample. However, the common royalty percentage in the leases at the measurement points we sampled from—which accounts for about 85 percent of measurement points in the RIK gas program—would make it easier to detect the under-delivering when prices were high. It follows that this may introduce a bias into our distribution of correlations. Specifically operators at those measurement points may be less likely to link gas allocations to price because they fear detection, therefore we would be less likely to find negative correlations. At measurement points with a mix of different royalty percentages—about 15 percent of measurement points in the RIK gas program—the potential for this practice may increase, and could result in more negative correlations. As table 1 shows, a more negative correlation would result in higher revenue losses for these measurement points. For example, a correlation of negative 0.5 would result in a loss of about \$21,000 during a 6-month time period for that measurement point.

⁵The average measurement point in our sample had an average (spot - base) differential of 0.235, with an average standard deviation of 0.522. Although it had an average of 0.170 allocation percentage, we applied an average of 0.167, with an average standard deviation of 0.074. We assumed an average of 0.167 because that is the entitled royalty percentage—so no long term imbalances in volume of gas would develop. It had an average of 5,826 decatherms of natural gas produced, with an average standard deviation of 1,527. We assumed no correlation between volume and price or allocation percentage.

**Appendix II: Analysis of the Relationship
between Price and Percentage of Gas
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on Federal Revenue**

Table 1: Results of Correlation Analysis

Correlation between (spot - base) and percentage of gas allocated to MMS	Estimated revenue during 6-month time period	Difference in revenue with zero correlation
-0.90	\$4,564	-\$36,912
-0.50	21,066	-20,441
-0.10	37,557	-3,973
-0.04	40,154	-1,379
0	41,509	-15
0.10	45,669	4,139
0.50	62,114	20,607
0.90	78,553	37,077

Source: GAO analysis.

Note: The difference in revenue is computed by subtracting the revenue under the correlation from the average differential between the spot and base prices, the average production volume, and the assumption that the percentage of gas allocated to MMS is 0.167. The shaded row indicates the rounded median correlation of negative 0.038 that we found.

Appendix III: Comments from the Department of the Interior



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240



JUL 20 2009

Mr. Frank Rusco
Director, Natural Resources and Environment
Government Accountability Office
441 G Street, NW
Washington, D.C. 20548

Dear Mr. Rusco:

Thank you for the opportunity to review and comment on the Government Accountability Office (GAO) draft report entitled, *Royalty-In-Kind Program: MMS Does Not Provide Reasonable Assurance It Receives Its Share of Gas. Resulting in Millions in Forgone Revenue* (GAO-09-744).

We generally agree with your findings and fully concur with four of your seven recommendations. Regarding the other three recommendations, we partially concur with two and do not concur with one. Responses to each recommendation are provided in the Enclosure. In addition, for your consideration, we have provided technical comments on the draft report via separate electronic transmission.

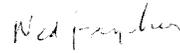
As noted in your draft report, the Minerals Management Service (MMS) has completed or has several efforts underway to improve gas imbalance processes and the knowledge base of its employees. The MMS identified issues related to royalty-in-kind (RIK) imbalances as part of a Fiscal Year 2007 annual review of internal controls performed in compliance with Office of Management and Budget Circular A-123, *Management's Responsibility for Internal Control*. In response, in June 2007 MMS issued a comprehensive 27-point action plan to address RIK imbalances and open receivables. The MMS has made substantial progress in implementing that action plan. Accomplishments include 1) increasing staffing levels within the RIK accounting group, 2) issuing notices to companies having past imbalances in excess of \$20 million, 3) hiring a third-party contractor to evaluate the RIK accounting processes and procedures and staffing skill sets and levels, 4) ensuring that accounting personnel receive specific training in oil and gas accounting, 5) implementing process improvements, and 6) initiating system improvements to the RIK imbalance reconciliation process.

As a general matter, it is important to note that production volume imbalances can be either positive or negative depending on whether the operator over-delivered or under-delivered production. While GAO acknowledges this point in certain sections of the draft report, the title and executive summary imply that past imbalances always result in forgone revenues, when in

fact imbalances can result in the Federal Government owing the operator money plus interest. Further, in cases where the operator under delivers production, the Federal Government does not forgo the revenues associated with the imbalance because MMS pursues any additional revenues owed plus interest when the imbalance exceeds certain thresholds, the RIK contract ends, or the property ceases production.

We appreciate GAO's insights and recommendations to improve the RIK Program. If you have any questions, please contact Andrea Nygren, MMS Audit Liaison Officer, at (202) 208-4343.

Sincerely,



Ned Farquhar
Acting Assistant Secretary
Land and Minerals Management

Enclosure

Enclosure

Response to Government Accountability Office Draft Report entitled, *Royalty-In-Kind Program: MMS Does Not Provide Reasonable Assurance It Receives Its Share of Gas, Resulting in Millions in Forgone Revenue (GAO-09-744)*.

Recommendation 1: *Complete establishing policies and procedures to ensure outstanding imbalances are valued appropriately and that the correct amount of interest is charged.*

Response: Concur. The Minerals Management Service (MMS) established its first written procedures for reconciling royalty-in-kind (RIK) oil and gas operator imbalances in 2005 and revised and enhanced those procedures in July 2007 to include additional internal controls, thresholds, cash out correspondence, and cash out calculation worksheets. More recently, MMS developed a policy to value imbalances and to calculate interest on a monthly basis and is seeking formal concurrence from the Office of the Solicitor as to the legal sufficiency of such a policy.

Recommendation 2: *Monitor daily gas imbalances to determine whether the allocation practices of gas operators are resulting in lost revenues to MMS. To the extent that this is occurring, identify and propose specific legislative changes that MMS believes are needed to require operators to deliver MMS's royalty percentage on a daily basis.*

Response: Do not concur. As a practical matter, natural gas is produced, delivered, and transported on a continuous basis. Current statutes already allow MMS to require operators to deliver production as it occurs.

The MMS believes that the operator's obligation to deliver MMS's royalty percentage should be the same whether royalties are paid in kind or in value. Further, we believe RIK imbalances should be calculated on a monthly basis just as they are for imbalances associated with royalties paid in value. Under the Royalty Fairness and Simplification Act (RFSA), royalty obligations become due "for any given production month . . . on the last day of the calendar month following the month in which oil or gas is produced." Id § 1724(c)(2). It is not disputed that RIK is a royalty obligation. The RFSA states that an "obligation" includes "any duty of a lessee . . . to deliver oil or gas royalty in kind." 30 U.S.C. § 1702(25)(B). We believe that Congress intended that a royalty obligation (paid in kind or in value) for a particular month becomes enforceable on the last day of the calendar month following the month of production. Changing the royalty obligation to a daily obligation is impractical and would be extremely costly and administratively burdensome to the Federal Government and to Federal oil and gas lease operators.

Recommendation 3: *Audit the operators and imbalance data of a sample of leases taken in kind and, on the basis of the audit findings, establish a risk-based auditing program for RIK properties.*

Response: Partially concur. The MMS currently verifies the accuracy of operator-reported data by systematically comparing the information reported by the operator to third-party source documentation, including run tickets for oil and gas volumes statements for natural gas. While MMS believes this process is sufficient to ensure the accuracy of operator-reported data, it will conduct an analysis of the benefits of conducting risk-based audits on a sample of leases.

Recommendation 4: *Promulgate RIK program regulations that protect the federal government's interests. At a minimum, regulations should require operators to submit imbalance statements in a standardized format within 60 days following the month of RIK production. They should also require the use of gas allocation methods MMS deems will ensure a fair return to the government.*

Response: Partially Concur. As a result of actions taken in response to a recommendation in the December 2007 final report of the Royalty Policy Committee, Subcommittee on Royalty Management, MMS is well underway in drafting regulations that address among other things the operator's obligation to deliver, report, and account for RIK production and to resolve or mitigate production imbalances. During the process of promulgating RIK regulations, MMS will evaluate 1) whether we should require operators to submit imbalance statements in a standardized format and 2) the use of gas allocation methods.

Recommendation 5: *Establish procedures, with reasonable deadlines, for resolving and collecting all RIK gas imbalances in a timely manner.*

Response: Concur. The MMS established its first written procedures for reconciling RIK oil and gas operator imbalances in 2005 and revised and enhanced those procedures in July 2007 to include additional internal controls, thresholds, cash out correspondence, and cash out calculation worksheets. Due primarily to the significant growth in the RIK program from 2005 to 2007, MMS was unable to resolve RIK imbalances in a timely manner. We believe that actions MMS has taken since 2007 (including reducing the growth in the RIK program) coupled with modifications to its existing procedures will allow MMS to systematically resolve gas imbalances in a timely manner in the future.

Recommendation 6: *Determine the information system enhancements necessary to effectively identify and resolve gas imbalances and put into practice such a system.*

Response: Concur. The MMS's June 2007 Action Plan for resolving RIK imbalances actually includes four actions related to information system enhancements to support the resolution of gas imbalances. Three of those actions are complete. The enhancement to MMS's RIK Property Imbalance Module has been delayed pending a necessary upgrade to the RIK invoicing system. We anticipate the upgrade and associated changes to be completed in September 2009 at which time MMS will proceed with the enhancements necessary to effectively identify and resolve gas imbalances.

Recommendation 7: *Conduct an RIK staffing and training needs analysis and put into place a corresponding staffing and training program for MMS staff.*

Response: Concur. The MMS has completed or has several efforts underway to analyze and improve the training needs of each employee. As a result, MMS has identified the need for and has increased staffing levels within the accounting group, hired a third-party contractor to evaluate RIK's accounting processes and procedures, including staffing skill sets and levels, and is ensuring that accounting personnel receive specific training in oil and gas accounting.

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Frank Rusco, (202) 512-3841 or ruscof@gao.gov

Staff Acknowledgments

In addition to the individual named above, key contributors to this report included Karla Springer, Assistant Director; Robert Baney; Benjamin Bolitzer; Melinda Cordero; Cindy Gilbert; Alison O'Neill; Dae Park; Justin Reed; Holly Sasso; Ben Shouse; and Barbara Timmerman.

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