

Design and Rationale of the Final Rule on Royalty Relief for Deep Gas Production from Shallow-Water Leases in the Gulf of Mexico

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Introduction

Natural gas production over the last 20 years from offshore Federal lands has been fairly constant at about 5 TCF per year, which supplies approximately 25 percent of domestic demand. Forecasts, however, indicate that demand for natural gas will increase significantly. For example, the Energy Information Administration projects that demand for natural gas in the United States could increase more than 50 percent in the next 20 years, rising from 22 TCF in 2003 to 35 TCF in 2025. Without new sources of domestic natural gas, there will be a growing imbalance between supply and demand, resulting in continued gas price volatility and an increased reliance on imports, such as liquefied natural gas (LNG) from overseas.

Production from deep wells in the shallow waters (less than 200 meters) of the Gulf of Mexico is one of the most attractive sources of additional natural gas supplies needed to alleviate predicted shortages and help moderate price increases over the next decade. Abundant infrastructure needed to produce the gas and transport it to onshore processing plants is already in place. Further, according to "Gulf of Mexico OCS Deep Shelf Gas Update: 2001-2002" published by the Minerals Management Service (MMS) in April 2003, completions in new deep gas reservoirs on the OCS are showing signs of providing the best opportunity for quickly increasing natural gas production. Well test information from recent deep gas completions suggests that production rates tend to increase with depth.

Deep gas exploration, however, requires large capital outlays and leading edge technology involving upgraded drilling rigs and advanced well design. Wells targeting deep-shelf reservoirs face a high risk of failure because of high pressure and temperature conditions, poor quality 3D seismic data, and an overall lack of experience by industry in drilling at very deep depths. Improved drilling and seismic exploration technologies are still needed to overcome many of the challenges associated with deep drilling.

To encourage and accelerate discovery and production of deep gas reserves, the MMS began offering a royalty relief incentive for shallow-water leases in the Gulf of Mexico starting with lease sales held in 2001. In accordance with the royalty relief provisions in the lease instrument,

a royalty suspension volume of 20 BCF of deep gas production is earned when a well is drilled and completed in a new deep gas reservoir and commences production within the first five years of the life of the lease. Deep gas production is defined as any gas production from a completion with the top of the perforated interval 15,000 feet or deeper subsea (true vertical depth below the datum at mean sea level). Royalties would be due, however, during a calendar year when the average gas price exceeds the threshold price of \$5.00 per MMBTU (\$3.50 per MMBTU for leases in Sale 178), which is adjusted annually for inflation from the year 2000. Currently, three leases issued since 2001 are producing under this deep gas royalty relief program.

The above incentive applies to 1,240 shallow-water leases issued since the beginning of 2001, but most of deep gas potential on the Gulf of Mexico Shelf, which the MMS believes could be as much as 55 TCF, underlies many of the 2,400 shallow-water leases in existence before 2001. On March 26, 2003, MMS published a proposed rule that would provide a deep gas royalty relief incentive for these leases. So lessees would not delay drilling new deep wells, MMS made the relief applicable to deep wells that commenced drilling on or after March 26, 2003, but the relief would only apply to production occurring on and after the effective date of the final rule.

The final rule was published on January 26, 2004, and will become effective on March 1, 2004. Since the date of the proposed rule, nine lessees have notified the MMS of their intent to drill a total of 28 deep wells on leases that were in effect before 2001.

Summary of Final Rule on Deep Gas Royalty Relief

A lease is eligible for deep gas royalty relief under the final rule if it (1) is located in the Gulf of Mexico wholly west of 87 degrees, 30 minutes West longitude, and in water depth less than 200 meters, (2) was in existence on January 1, 2001, or elected a one-time option to replace the deep gas royalty relief terms in the lease instrument with the terms in the final rule, and (3) has not produced from a well with a perforated interval, the top of which is 18,000 feet TVD SS or deeper, which commenced drilling before the date of the proposed rule (March 26, 2003).

A qualified well can earn a royalty suspension volume up to 25 BCF for deep gas production, which is the maximum suspension volume allowed per lease. A **qualified well** is an original (new) well or sidetrack with a perforated interval, the top of which is at least 15,000 TVD SS, that begins drilling on or after March 26, 2003, commences production within five years following the effective date of the final rule, and meets the regulatory reporting requirements. Deep sidetracks earn a royalty suspension volume based on the actual length of the sidetrack. Subsequent qualified wells may share in the lease's royalty suspension volume.

A lease may also earn a royalty suspension supplement up to 5 BCFE by drilling an unsuccessful well or sidetrack to a target depth of 18,000 feet TVD SS or deeper. A lease is allowed two royalty suspension supplements or a maximum of 10 BCFE. A royalty suspension supplement can only be earned if no qualified well has produced on the lease at or below 18,000 feet TVD SS. Future oil and gas production from the lease, regardless of depth, can be applied toward a royalty suspension supplement.

On the basis of the above incentives, a lease can earn the right to produce as much as 35 BCFE of royalty-free hydrocarbon, that is 10 BCFE for two unsuccessful wells and then 25 BCF for a subsequent qualified well drilled to at least 18,000 feet TVD SS. Further details on specific royalty suspension volumes and supplements that can be earned by an eligible lease are found later in this paper under *Main Components of the Final Rule*.

In the proposed rule, if the average gas price for a calendar year exceeds the threshold price established at \$5.00 per MMBTU, adjusted annually for inflation from the year 2000, then the lessees must pay royalties on deep gas production for that calendar year. The MMS has decided to revise the gas price threshold in the final rule. The revised threshold is \$9.34 per MMBTU, adjusted annually for inflation from the year 2004. A discussion of the price threshold can be found in this paper under *Major Issues*.

Major Issues

Following publication of the Proposed Rule for Deep Gas Royalty Relief on March 26, 2003, the MMS addressed five major issues based on comments received from industry at an MMS sponsored workshop held in Houston on April 30, 2003, and written comments submitted by 14 respondents.

1. Lease/Well Eligibility

The MMS received comments requesting that we either drop the stipulation that leases with previous deep gas production are not eligible for relief or that we consider deep wells drilled on leases with previous deep production be eligible for relief if drilled to a substantially deeper depth.

It was the MMS' position in the proposed rule that a lease already producing from a deep depth did not need royalty relief as an incentive to conduct additional deep drilling operations. While we still believe deep drilling and production prior to March 26, 2003, reduces the economic risks associated with further deep drilling, it is less likely to reduce the risks associated with drilling to a deeper depth interval.

Therefore, the MMS has reconsidered its position in the proposed rule on this issue. The final rule provides a royalty suspension volume for a qualified well drilled to 18,000 feet TVD SS or deeper even if there was production on the lease from 15,000 to less than 18,000 feet TVD SS, regardless if the production was prior to or after March 26, 2003. Since the successful drilling of a well in the 15,000 to less than 18,000 feet category may provide some encouragement to drill to a deeper target, the MMS has established under this scenario a lower royalty suspension volume for the deeper depth interval. For example, if a lease has production from 15,000 to less than 18,000 feet TVD SS, and subsequent production from a qualified original well at 18,000 feet TVD SS or deeper, then the lease earns a royalty suspension volume of 10 BCF, the difference in the royalty suspension volumes for the two depth intervals.

Further, in the proposed rule the first qualified well establishes the royalty suspension volume for the lease. For example, if the first qualified original well produces from 15,000 to less than

18,000 feet TVD SS, the royalty suspension volume for the lease under the proposed rule would be limited to 15 BCF, which is the suspension volume applicable to that depth interval. The MMS has structured the final rule so that the total magnitude of the royalty suspension volume that can be earned on the lease is independent of the order in which wells are drilled to different depth categories. If a qualified original well produces from 15,000 to less than 18,000 feet TVD SS and another qualified original well produces from 18,000 feet TVD SS or deeper, then the lease would earn a royalty suspension volume of 25 BCF no matter which well commenced production first.

2. Sidetracks

The MMS received many comments requesting that sidetrack drilling be eligible for deep gas royalty relief. We decided not to include sidetracks in the proposed rule because of large variations in sidetrack costs, with the average cost being significantly less than new wells. Further, we had very limited cost data on sidetracks drilled to deep depth intervals. However, based on comments we received from industry that sidetracks could be used extensively for drilling deep targets, the MMS concluded that royalty relief for sidetracks would provide a meaningful incentive for encouraging and accelerating deep gas drilling and production. Accordingly, the final rule includes relief for sidetrack drilling.

The royalty suspension volume varies based on the actual length of the sidetrack. We developed a formula based on our economic analysis whereby a portion of the royalty suspension volume is a fixed amount associated with completion and platform modification costs and a variable amount associated with the sidetrack drilling cost. The formula we use in the final rule is 4 BCF + 0.6 BCF per 1,000 feet of sidetrack length, not to exceed the royalty suspension volume for new wells.

Unsuccessful sidetracks with a length of at least 10,000 feet and drilled to 18,000 feet TVD SS or deeper may earn a royalty suspension supplement. The MMS determined that a royalty suspension supplement would not be a meaningful incentive for sidetracks less than 10,000 feet. The formula for determining the supplement amount is 0.8 BCF + 0.12 BCF per 1,000 feet of sidetrack length.

The MMS also received several comments on the definitions of bypass and sidetrack as presented at our workshop on April 30, 2003. In the final rule, we make it clear that a bypass (a remedial drilling effort in which a portion of a hole is redrilled) is considered a drilling operation associated with the original (new) well or sidetrack. Therefore, a bypass does not affect the royalty suspension volume. Further, a sidetrack is defined to include the drilling of a well from a platform slot reclaimed from a previously drilled well and the re-entry and deepening of an existing well. Furthermore, the definition of an original well in the final rule clarifies that all sidetracks drilled from an original well before the drilling rig moves off the well location are considered part of the original well and the royalty suspension volume designated for original wells is applicable.

3. Unitization

A number of comments received by the MMS recommended that the royalty suspension volume earned by a unit well should be allocated in proportion to the royalty obligation in the unit, i.e., the same allocation as unit production. Several respondents pointed out that in many cases involving units, the value of the relief will be diminished. For example, if deep production from one well is allocated on a 50/50 basis to two unitized leases, then under the proposed rule only gas production allocated to the lease with the deep well is royalty free. Therefore, the deep well would have to produce 30 BCF to receive the full royalty free incentive of 15 BCF. While MMS understands the rationale for the recommended approach, following considerable discussion and careful consideration of this issue, we rejected the recommendation.

Since a unit acts as a single entity, same as a lease, deep gas royalty relief under a true unit-based approach would consist of one royalty suspension volume earned by the drilling of a deep unit well. The volume would then be allocated to the unitized leases in the same proportion as production. Additionally, under a unit-based approach rather than individual unit leases being ineligible for relief (e.g., production from a well drilled before March 26, 2003), the entire unit would be ineligible. Under the lease-based approach in the proposed and final rules, each eligible unit lease can earn a royalty suspension volume with the drilling of a deep well. The volume is not allocated to the other unit leases. This approach potentially provides a larger, more valuable incentive than the true unit-based approach. The above comments from industry are apparently suggesting, as was discussed at the workshop, a hybrid approach whereby the royalty suspension volume is earned on a lease basis and ineligibility is limited to individual unit leases, but the allocation of the suspension volume is on a unit basis.

Even with the hybrid approach, some leases in a unit that are allocated production may not be eligible for deep gas royalty relief and, therefore, cannot be allocated a royalty suspension volume. For example, approximately 50 percent of the existing shallow-water units have either a State lease or an ineligible Federal lease that cannot be allocated a royalty suspension volume at one or both well depth intervals. Ineligible Federal leases include those leases in water depths deeper than 200 meters or with deep production from wells that commenced drilling prior to March 26, 2003. Other units may contain leases issued after January 1, 2001, which have deep gas royalty relief with different magnitudes and no provisions in the lease instrument requiring the lessee to allocate the royalty suspension volume.

Further, the lease-based approach will result in significantly less administrative burden. If the royalty suspension volume is allocated, in addition to the initial allocation, several reallocations may be needed when the results of new wells are obtained. Furthermore, after the initial royalty suspension volume is earned for the unit, the drilling of the first qualified well on each remaining unitized lease would require a calculation of the remaining royalty suspension volume prior to reallocating the revised suspension volume. In addition, when production data are updated, “look-backs” would be needed to confirm the accuracy of the reallocation or make necessary adjustments.

Under the final rule and MMS unitization policy, separate participating areas will allocate royalty-bearing and royalty-free gas production. Shallow reservoirs and ineligible deep

reservoirs will be in the royalty-bearing participating area and reservoirs with qualified wells will be in the royalty-free participating area. In the royalty-free participating area, however, only gas production allocated to leases that earned a royalty suspension volume is royalty-free. The unit working interest owners can allocate royalty relief benefits using the Unit Operating Agreement to offset any imbalance from royalty relief going only to a unit participant with a qualified well.

In conclusion, MMS recognizes that using lease-based royalty relief for units combined with our customary allocation of production policy may require, in order to obtain maximum relief, production volumes above the royalty suspension volume. However, as discussed above, matching the allocation of production with the allocation of royalty suspension volume creates problems when the unit encompasses eligible and ineligible leases or leases issued after January 1, 2001.

4. Price Threshold

The proposed rule includes a gas price threshold of \$5 per MMBTU, adjusted annually from the year 2000 for inflation. Lessees must pay royalties during any calendar year in which the average daily closing gas price on the New York Mercantile Exchange (NYMEX) exceeds the threshold price, and the production during such year counts against the royalty suspension volume. A threshold was included in the proposed rule and other MMS royalty relief programs because, in general, when prices exceed the threshold, royalty relief is unnecessary to achieve the desired level of exploration and development.

Industry strongly recommended that MMS eliminate or revise the gas price threshold to remove the uncertainty about the availability of royalty relief. Lessees commented that eliminating royalty relief in the face of tightening supplies is exactly the opposite of what should be done and, with prices currently above the threshold, there may be no royalty relief incentive for deep drilling this year.

In response to the comments, MMS conducted an in-depth study of the price threshold issue considering incremental production, net effect on royalties, and price volatility. While high gas prices would normally be sufficient to increase deep gas drilling significantly, MMS now believes that rising prices accompanied by volatile price swings, which the market has been experiencing, will moderate any increase in deep drilling. MMS has concluded that modifying the price threshold in the proposed rule would improve our deep gas royalty relief incentive program. In the final rule, the gas price threshold is \$9.34 per MMBTU, adjusted annually after 2004 for inflation.

5. Ultra-Deep Drilling Category

The proposed rule for deep gas royalty relief did not provide any additional relief for ultra-deep drilling below 20,000 feet. Wells drilled 18,000 feet TVD SS or deeper could earn a royalty suspension volume of 25 BCF of deep gas production. Several industry comments on the proposed rule supported a larger suspension volume (35 to 45 BCF) for ultra-deep drilling because of a dramatic increase in the cost of wells drilled below 20,000 feet.

The MMS does not have sufficient data needed to conduct an economic analysis for determining an appropriate royalty suspension volume for an ultra-deep drilling category. It would be difficult to predict accurately the chance of drilling success, the potential size of discoveries, and the average drilling and completion cost. In addition, adding an ultra-deep drilling category would have delayed the regulatory process, including publication of the final rule.

Congress is considering new energy legislation including royalty relief for ultra-deep drilling. If this legislation passes, MMS intends to offer a comment period on royalty relief for ultra-deep drilling and subsequently issue a final rule on the subject consistent with the Congressional legislation.

Main Components of the Final Rule

1. Lease Eligibility

- a. *A lease must have been in existence on January 1, 2001.* Designated leases issued after this date are eligible for deep gas royalty relief pursuant to the royalty suspension provisions in the lease instrument. Leases issued after January 1, 2001, will have a one-time opportunity to replace the deep gas royalty relief in the lease terms with the deep gas provisions in the final rule.
- b. *A lease must be located in the Gulf of Mexico wholly west of 87 degrees, 30 minutes West longitude in water less than 200 meters deep.* The Deep Water Royalty Relief Act of 1995 provides MMS the authority to reduce, modify, or eliminate any royalty to promote development, increase production, or encourage production of marginal reserves on certain leases or categories of leases. This authority applies to both deep and shallow-water leases in the above designated area. The MMS decided not to apply the deep gas royalty relief program to leases in water depths 200 meters or deeper because these leases are eligible for relief under our deepwater program. However, leases partly in water depths greater than 200 meters that are not eligible for relief under the deepwater program may be eligible for relief under the deep gas program.
- c. *A lease must not have produced from a well with a perforated interval the top of which is 18,000 feet TVD SS or deeper that commenced drilling before March 26, 2003.* If a lease has produced from a well with the top of the perforated interval from 15,000 to less than 18,000 feet TVD SS (regardless if that production occurred before or after March 26, 2003), then the lease can still earn a royalty suspension volume by drilling a successful well with the top of the perforated interval 18,000 feet TVD SS or deeper. In the proposed rule, a lease was not eligible for any royalty suspension volume if it had production from a deep well (top of the perforated interval 15,000 feet TVD SS or deeper) that commenced drilling before March 26, 2003.

2. Royalty Suspension Volume

- a. An eligible lease that has not produced from a deep well (15,000 TVD SS) that commenced drilling before March 26, 2003, may earn a royalty suspension volume shown in the following table:

If the lease has a qualified well that is . . .	Then the lease earns a royalty suspension volume on this amount of gas production
An original well with a perforated interval, the top of which is from 15,000 to less than 18,000 feet TVD SS.	15 BCF
A sidetrack with a perforated interval, the top of which is from 15,000 to less than 18,000 feet TVD SS.	4 BCF plus 600 MCF times sidetrack measured depth (rounded to the nearest 100 feet) but no more than 15 BCF.
An original well with a perforated interval, the top of which is 18,000 feet TVD SS or deeper.	25 BCF
A sidetrack with a perforated interval, the top of which is 18,000 feet TVD SS or deeper.	4 BCF plus 600 MCF times sidetrack measured depth (rounded to the nearest 100 feet) but no more than 25 BCF.

- b. If an eligible lease has produced from a well with a perforated interval, the top of which is from 15,000 to less than 18,000 feet (regardless if the production was before or after March 26, 2003), and the lease subsequently has a qualified well with a perforated interval, the top of which is 18,000 feet TVD SS or deeper, then the following royalty suspension volumes are applicable:

If the subsequent qualified well is . . .	Then you earn a royalty suspension volume on this amount of gas production.
An original well or a sidetrack with a perforated interval, the top of which is from 15,000 to less than 18,000 feet TVD SS.	0 BCF
An original well with a perforated interval, the top of which is 18,000 feet TVD SS or deeper.	10 BCF
A sidetrack with a perforated interval, the top of which is 18,000 feet TVD SS or deeper.	4 BCF plus 600 MCF times sidetrack measured depth (rounded to the nearest 100 feet) but no more than 10 BCF.

- c. Royalties will be suspended on gas volumes produced by qualified wells on and after the effective date of the final rule (March 1, 2004) and reported on the Oil and Gas Operations Report, Part A (OGOR-A). The OGOR-A is the only form filed by lessees where production is required to be reported by well. Since only certain wells on a lease will have deep gas royalty relief, the use of OGOR-A was the only practical option for monitoring royalty-free production. Although some of the gas production reported on

OGOR-A is not normally royalty-bearing (fuel, flare, etc.), this is generally a very small percentage of the total production. Using OGOR-A should only slightly reduce the royalty suspension volume earned by a lease.

- d. Production from all qualified wells, regardless of drilling depth category, may be applied toward the lease's royalty suspension volume. Production must commence from the well within 5 years following the effective date of the final rule.
- e. If a lease is part of an MMS-approved unit, the royalty suspension volume earned by a qualified well drilled on that lease applies only to that lease and not to other leases within the unit. Production from all qualified wells on a non-unitized portion of the lease and production allocated to the lease from qualified wells on the lease and other leases in the unit may be applied toward the royalty suspension volume.
- f. Lessees must notify, in writing, the Regional Supervisor for Production and Development of their intent to begin drilling operations on deep wells. Further, within 30 days following commencement of production, lessees must notify the Regional Supervisor that production has begun and request confirmation of the size of the royalty suspension volume.

3. Royalty Suspension Supplement

- a. With the drilling of a certified unsuccessful well (see definition in final rule) to at least 18,000 feet TVD SS, a lease may earn a royalty suspension supplement shown in the following table:

If the certified unsuccessful well is . . .	Then the lease earns a royalty suspension supplement on this volume of oil and gas production.
An original well and the lease has not produced gas or oil from a deep well.	5 BCFE
A sidetrack (with a sidetrack measured depth of at least 10,000 feet) and the lease has not produced gas or oil from a deep well.	0.8 BCFE plus 120 MCFE times sidetrack measured depth (rounded to the nearest 100 feet) but no more than 5 BCFE.
An original well or a sidetrack (with a sidetrack measured depth of at least 10,000 feet) and the lease has produced gas or oil from a deep well with a perforated interval, the top of which is from 15,000 to less than 18,000 feet TVD SS.	2 BCFE

- b. Royalties will be suspended on oil and gas volumes produced from the lease, regardless of depth, as reported on the OGOR-A. The royalty suspension supplement will be effective the day the information described in paragraph d. of this section is submitted to

the MMS. If a lease is part of an MMS-approved unit, royalties will be suspended on unit oil and gas production allocated to the lease.

- c. A lease is eligible for two royalty suspension supplements with a maximum of 10 BCFE per lease. Royalty suspension supplements must be earned prior to production from a well with the top of the perforated interval 18,000 feet TVD SS or deeper. A single wellbore cannot earn more than one royalty suspension supplement.
- d. Within 60 days after drilling an unsuccessful well 18,000 feet TVD SS or deeper, the lessee must provide the Regional Supervisor with the following information needed to confirm that a certified unsuccessful well has been drilled:
 - (1) Well log data, if the well or sidetrack does not meet the producibility requirements of 30 CFR Part 250, Subpart A,
 - (2) Well log, well test, seismic, and economic data if the well does meet the above producibility requirements, and
 - (3) Information that allows the Regional Supervisor to confirm the size of the royalty suspension supplement for a sidetrack, including sidetrack measured depth and supporting documentation.

4. Price Threshold

Lessees must pay royalties on production, which would otherwise be royalty free under the final rule, for any calendar year when the average daily NYMEX natural gas price exceeds the price threshold. The gas price threshold is \$9.34 per MMBTU for calendar year 2004 with an annual adjustment for inflation. The inflation adjustment is determined by the percentage that the implicit price deflator for the gross domestic product, as published by the Department of Commerce, changed during the calendar year. Royalties plus interest are due no later than 90 days after the end of the calendar year. Production volumes during a calendar year when the threshold price is exceeded count as part of the royalty suspension volume and royalty suspension supplement.

5. Substitution Option for New Leases

The final rule provides a one-time option for lessees of shallow-water Gulf of Mexico leases issued as part of an OCS lease sale held after January 1, 2001, to replace the deep gas royalty relief terms in the lease instrument with the royalty relief terms in the final rule. Lessees must notify, in writing, the Regional Supervisor for Production and Development within 180 days after the effective date of the final rule or 180 days after the lease was issued, whichever is later. Exercising the option is irrevocable.

Conclusion

The objective of the Final Rule for Deep Gas Royalty Relief is to offer an incentive in the form of a royalty suspension that will promote a substantial increase in deep gas drilling and production in the shallow waters of the Gulf of Mexico. The incentive is designed to provide temporary financial assistance to developers to stimulate investment in deep drilling and production needed for the near and mid-term energy security of the United States.

REFERENCES

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