

Gulf of Mexico Outer Continental Shelf Daily Oil and Gas Production Rate Projections From 2003 Through 2007



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U.S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region

**OCS Report
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Table of Abbreviations

BCFPD	billion cubic feet per day
GOM	Gulf of Mexico
MBOPD	thousand barrels of oil per day
MMCFPD	million cubic feet per day
MMS	Minerals Management Service
OCS	Outer Continental Shelf

Introduction

This paper provides daily oil and gas production rate projections for the Gulf of Mexico (GOM) Outer Continental Shelf (OCS) for the years 2003 through 2007. These projections represent average daily oil and gas production estimates for each calendar year.

In this report, daily oil production rates include both oil and condensate production, and daily gas production rates include both associated and nonassociated gas production. Deepwater fields are defined as those with an average water depth greater than or equal to 1,000 feet.

Daily Production Rate Projections

The production rate projections presented in this report include high- and low-range estimates of future daily oil (oil and condensate) and gas (associated and nonassociated) production for the GOM during the years 2003-2007.

Methodology

We determined shallow-water production rates for this report using a decline analysis of historical, shallow-water GOM production rates. This decline analysis was last used in the 2000 report (Melancon et al., 2000) and holds high-case shallow-water rates constant for the reporting period, 2003-2007. We determined deepwater production rates for this report using the same method used in preparing last year's report—a survey of operators.

The following assumptions are integral to the validity of this methodology:

1. We assume that the same factors that have influenced the cumulative shallow-water production rates over the past 20 years will similarly affect the production rates over the next 5 years. These factors include but are not limited to

- Rate of reserves replacement.
- Availability of pipelines and processing facilities to handle production.
- Ability of operators to obtain necessary equipment and personnel to develop new reserves.

- The effect that new technology has on finding and developing reserves.

2. The high-case scenarios for both oil and gas assume that new technology will offset decline rates in currently producing shallow-water fields. Thus, shallow-water GOM production will remain constant at the rates of 671 MBOPD and 9.19 BCFPD through the year 2007.

3. For the low-case oil and gas projections, we assume that shallow-water production rates will decline at the same rate as observed during the last period of sustained shallow-water declines. This results in a 6.1 percent decline for oil (1997-2000) and a 5.2 percent decline for gas (1996-2000).

4. We assume that all discovered deepwater fields that will begin production prior to 2008 were reported in our operator survey, and that the operators accurately predicted future production rates (within 7 to 8 percent) for these fields.

Low-case Production Rate Projections

The average daily low-case, shallow-water oil and gas production rates for 2003 through 2007 were calculated using the estimated average daily production rates for oil and gas in 2002 and the decline rate determined above.

We ranged the deepwater production rate projections by assuming an error range of 7 percent for oil and 8 percent for gas (Melancon and Baud, 2000).

Daily Production Rate Projections (continued)

The total projected average daily low-case production rates for 2003 through 2007 were calculated by adding low-case shallow-water production rates to the low-case deepwater production rates.

High-case Production Rate Projections

The average daily high-case shallow-water production rates for 2003 through 2007 were obtained by holding the average daily production rates for oil and gas in 2002 constant through 2007. The average daily high-case, deepwater production rates were calculated by adding 7 percent (oil) or 8 percent (gas) to estimated production rates for deepwater projects obtained from a survey of operators. The total high-case production rate projections were then obtained by adding the high-case shallow- and deepwater estimates.

Results

Table 1 lists 69 deepwater fields that have begun production and the 31 fields projected

to begin production through the year 2007. Note that some fields listed in previous reports are absent because the average field water depth dropped below 1,000 feet (average field water depth is an arithmetic average of all wells within the field), the project was cancelled or delayed, or the operator was unwilling to release the information. Note also that some fields in this table include multiple prospects but are combined according to the manner reported by operators or the manner in which MMS defines fields.

Table 2 and Figures 1 and 2 provide the high- and low-range daily oil and gas rate projections in tabular and graphical forms, respectively. Table 3 and Figures 3 and 4 separate shallow- and deepwater production rate projections.

Undiscovered or unreported fields in any water depth coming on production by the year 2008 will further increase these daily production totals.

**Table 1. — Deepwater Fields on Production or Expected to Commence Production by
Yearend 2007**

Operator	Field Nickname	Block	Water Depth (FT)	Year of First Production
Shell	Cognac	MC 194	1,023	1979
ExxonMobil	Lena	MC 281	1,017	1984
Oryx	Unnamed	GC 75	2,172	1988*
Placid	Unnamed	GC 29	1,554	1988*
Shell	Bullwinkle	GC 65	1,330	1989
Conoco	Jolliet	GC 184	1,724	1989
BP	Amberjack	MC 109	1,050	1991
Oryx	Diamond	MC 445	2,095	1993*
Tatham	Seattle Slew	EW 914	1,019	1993*
ExxonMobil	Zinc	MC 354	1,475	1993
Shell	Auger	GB 426	2,863	1994
BP	Pompano/Pompano II	VK 990	1,440	1994
Shell	Tahoe/ Tahoe II	VK 783	1,391	1994
EEX	Cooper	GB 387	2,260	1995*
Walter	Unnamed	VK 862	1,043	1995
Shell	Mars	MC 807	2,992	1996
Shell	Popeye	GC 116	2,065	1996
Shell	Rocky	GC 110	1,719	1996
Shell	Mensa	MC 731	5,276	1997
Kerr McGee	Neptune/Thor	VK 825	1,866	1997
Shell	Ram-Powell	VK 956	3,243	1997
BP	Troika	GC 244	2,679	1997
Marathon	Arnold	EW 963	1,752	1998
Amerada Hess	Baldpate	GB 260	1,604	1998
Agip	Morpeth/Klamath	EW 921	1,747	1998
Shell	Salsa	GB 171	1,121	1998
Agip	Allegheny	GC 254	3,194	1999
Shell	Angus	GC 112	1,901	1999
ExxonMobil	Diana	EB 945	4,670	1999
Mariner	Dulcimer	GB 367	1,123	1999
ChevronTexaco	Genesis	GC 205	2,597	1999
ChevronTexaco	Gemini	MC 292	3,488	1999
Shell	Macaroni	GB 602	3,691	1999
Mariner	Pluto	MC 718	2,748	1999
Walter	Unnamed	EW 1006	1,832	1999
Shell	Ursa	MC 810	3,877	1999
TotalFinaElf	Virgo	VK 823	1,136	1999
Shell	Europa	MC 935	3,880	2000
ExxonMobil	Hoover	AC 25	4,806	2000
BP	Marlin	VK 915	3,300	2000
Amerada Hess	Northwestern	GB 200	1,261	2000
ChevronTexaco	Petronius	VK 786	1,753	2000
Shell	Brutus	GC 158	2,952	2001
Shell	Einset	VK 873	3,584	2001
Shell	Crosby	MC 899	4,400	2001
ATP	Ladybug	GB 409	1,357	2001
ExxonMobil	Marshall	EB 949	4,376	2001
ExxonMobil	Mica	MC 211	4,337	2001
BP	Nile	VK 914	3,535	2001
Shell	Oregano	GB 559	3,400	2001
Argo	Prince	EW 958	1,493	2001
Shell	Serrano	GB 516	3,359	2001
ChevronTexaco	Typhoon	GC 236	2,679	2001
Walter	Unnamed	EW 878	1,585	2001
Walter	Unnamed	MC 68	1,214	2001
Amerada Hess	Tulane	GB 200	1,300	2002
BP	King/Horn Mountain	MC 84	5,385	2002
BP	King's Peak	MC 133	6,400	2002
BP	Aspen	GC 243	3,063	2002
ExxonMobil	Madison	AC 24	4,854	2002

Table 1. (Continued) — Deepwater Fields on Production or Expected to Commence Production by Yearend 2007

Operator	Field Nickname	Block	Water Depth (FT)	Year of First Production
Kerr-McGee	Nansen	EB 602	3,677	2002
Kerr-McGee	N. Boomvang	EB 643	3,548	2002
Kerr-McGee	Navajo	EB 690	4,300	2002
Mariner	King Kong	GC 472	3,799	2002
Samedan Oil	Lost Arc	EB 421	2,740	2002
Shell	Princess	MC 765	3,600	2002
Spinnaker Exploration	Sangria	GC 177	1,487	2002
TotalFinaElf	Aconcagua	MC 305	7,043	2002
TotalFinaElf	Camden Hills	MC 348	7,210	2002
Anadarko	MC 401	MC 401	1,139	2003
Unreleasable	Unreleasable	Unreleasable	Unreleasable	2003
Dominion	Devil's Tower	MC 773	5,607	2003
Murphy	Medusa	MC 582	2,131	2003
Pioneer	Falcon	EB 579	3,419	2003
Shell	Ariel/Nakika	MC 429	6,274	2003
Shell	East Anstey/Nakika	MC 607	6,590	2003
Shell	Fourier/Nakika	MC 522	6,950	2003
Shell	Herschel/Nakika	MC 520	6,739	2003
Shell	Keppler/Nakika	MC 782	5,800	2003
Total Fina Elf	Matterhorn	MC 243	3,085	2003
Anadarko	Marco Polo	GC 608	4,286	2004
Unreleasable	Unreleasable	Unreleasable	Unreleasable	2004
BP	Mad Dog	GC 826	4,951	2004
BP	Holstein	GC 644	4,329	2004
Unreleasable	Unreleasable	Unreleasable	Unreleasable	2004
ConocoPhillips	Magnolia	GB 783	4,673	2004
Unreleasable	Unreleasable	Unreleasable	Unreleasable	2004
Kerr-McGee	Red Hawk	GB 877	5,334	2004
Kerr-McGee	Gunnison	GB 668	3,132	2004
Pioneer	Front Runner	GC 339	3,329	2004
Shell	Coulomb/Nakika	MC 657	7,555	2004
Unreleasable	Unreleasable	Unreleasable	Unreleasable	2004
Unreleasable	Unreleasable	Unreleasable	Unreleasable	2004
Unreleasable	Unreleasable	Unreleasable	Unreleasable	2004
Unreleasable	Unreleasable	Unreleasable	Unreleasable	2005
Unreleasable	Unreleasable	Unreleasable	Unreleasable	2005
Kerr-McGee	Balboa	EB 597	3,352	2005
BP	Thunder House	MC 778	6,089	2006
Unreleasable	Unreleasable	Unreleasable	Unreleasable	2006
Unreleasable	Unreleasable	Unreleasable	Unreleasable	2006

*Indicates fields that are no longer on production.

Table 2. — Daily Oil and Gas Production Rate Projections - GOM

	2003	2004	2005	2006	2007
Low Oil MBOPD* (Decline Used)	1,530	1,639	1,756	1,797	1,580
High Oil MBOPD* (No Decline Used)	1,706	1,876	2,052	2,139	1,926
Low Gas BCFPD** (Decline Used)	11.98	11.75	11.50	10.77	9.86
High Gas BCFPD** (No Decline Used)	13.03	13.29	13.50	13.12	12.51

Table 3. — Daily Oil and Gas Production Rate Projections Separated into Deepwater and Shallow-water Fields.

	2003	2004	2005	2006	2007
Low-case Deepwater Oil MBOPD*	900	1,047	1,200	1,276	1,090
High-case Deepwater Oil MBOPD*	1,035	1,204	1,381	1,468	1,254
Low-case Shallow-water Oil MBOPD*	630	592	556	522	490
High-case Shallow-water Oil MBOPD*	671	671	671	671	671
Low-case Deepwater Gas BCFPD**	3.27	3.49	3.67	3.35	2.82
High-case Deepwater Gas BCFPD**	3.83	4.10	4.31	3.93	3.32
Low-case Shallow-water Gas BCFPD**	8.71	8.26	7.83	7.42	7.04
High-case Shallow-water Gas BCFPD**	9.19	9.19	9.19	9.19	9.19

*Oil in MBOPD includes condensate.

**Gas in BCFPD includes associated or casinghead gas.

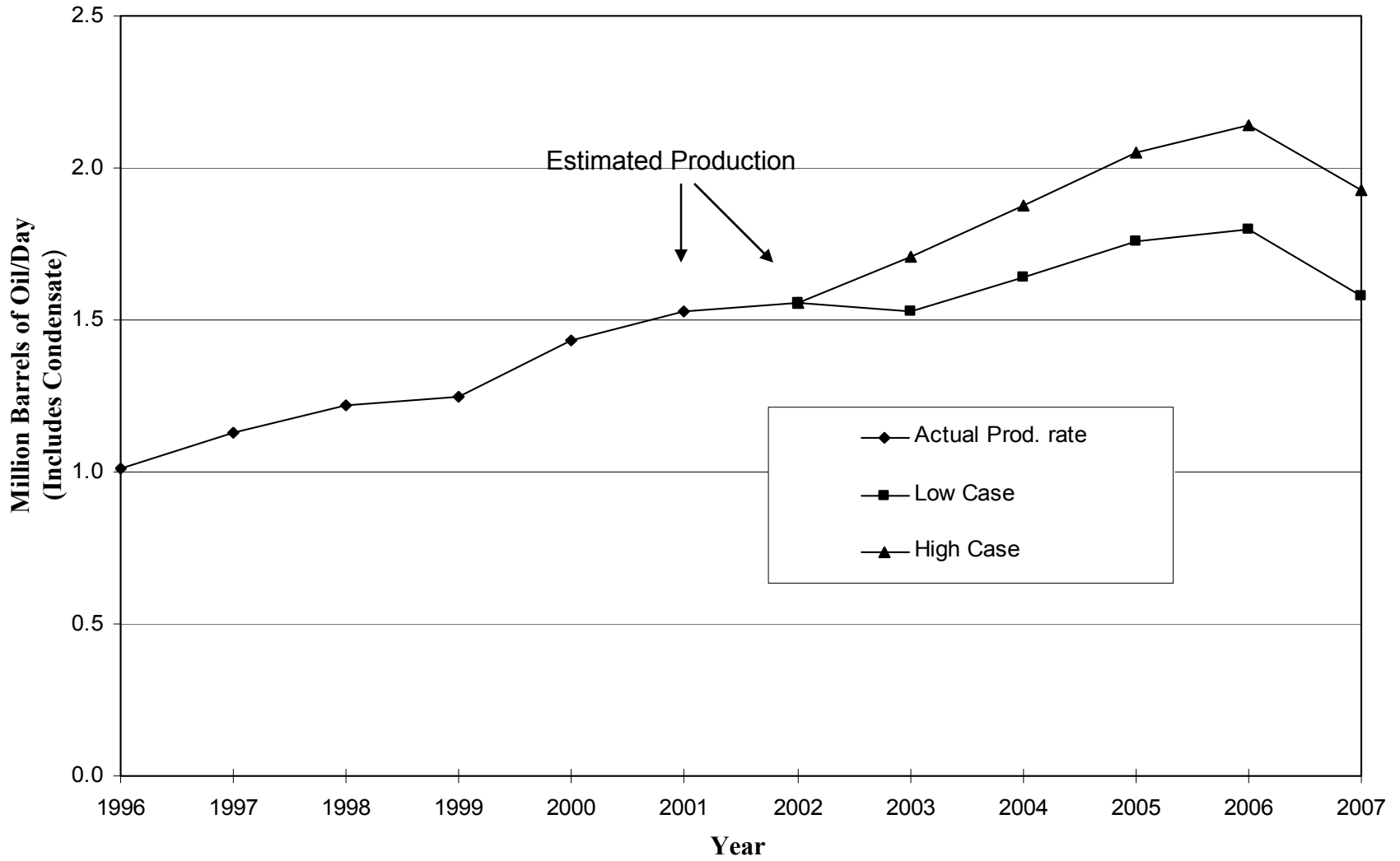


Figure 1. – Oil Production Rate Projections, Gulf of Mexico Region

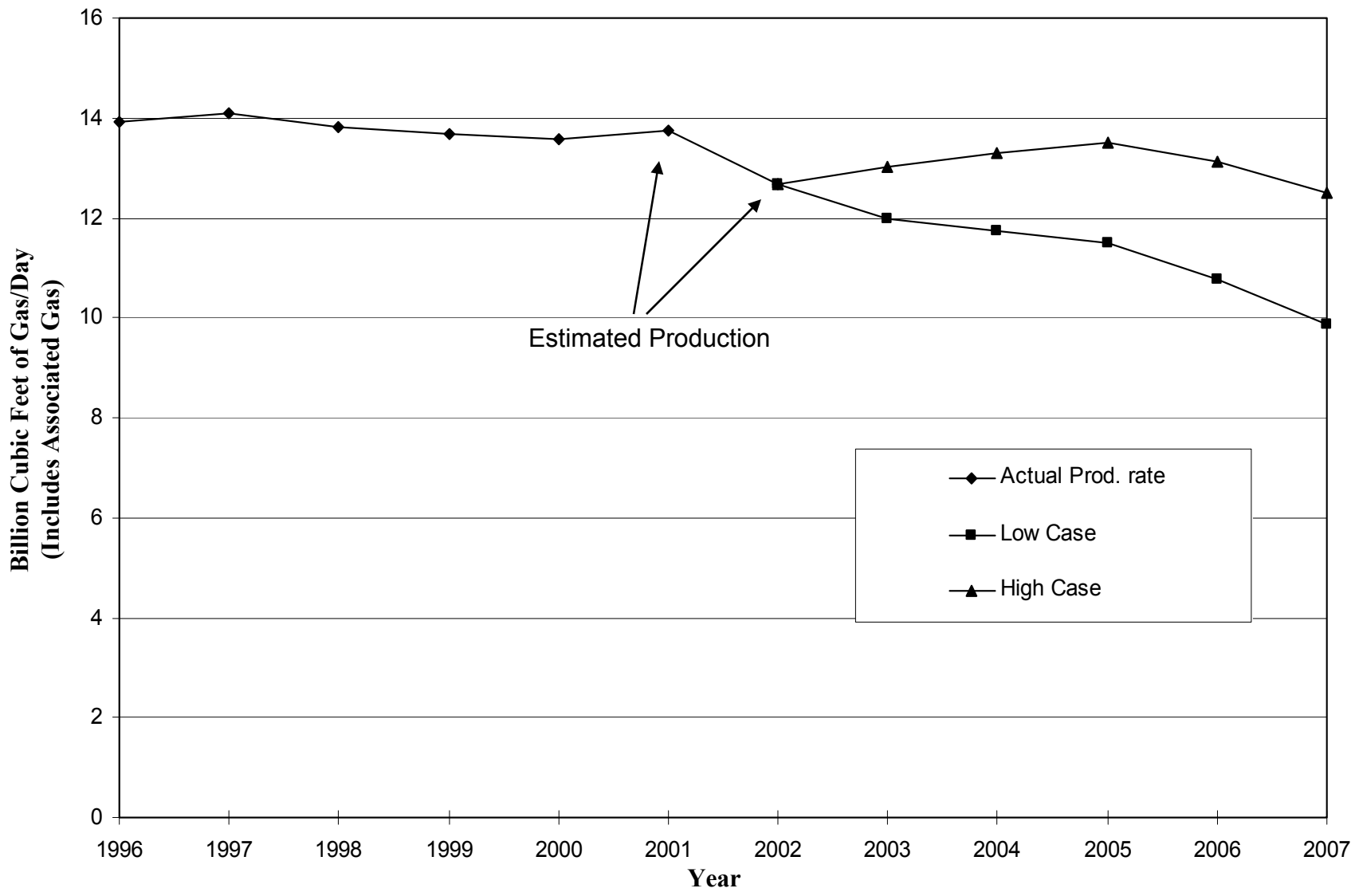


Figure 2. – Gas Production Rate Projections, Gulf of Mexico Region

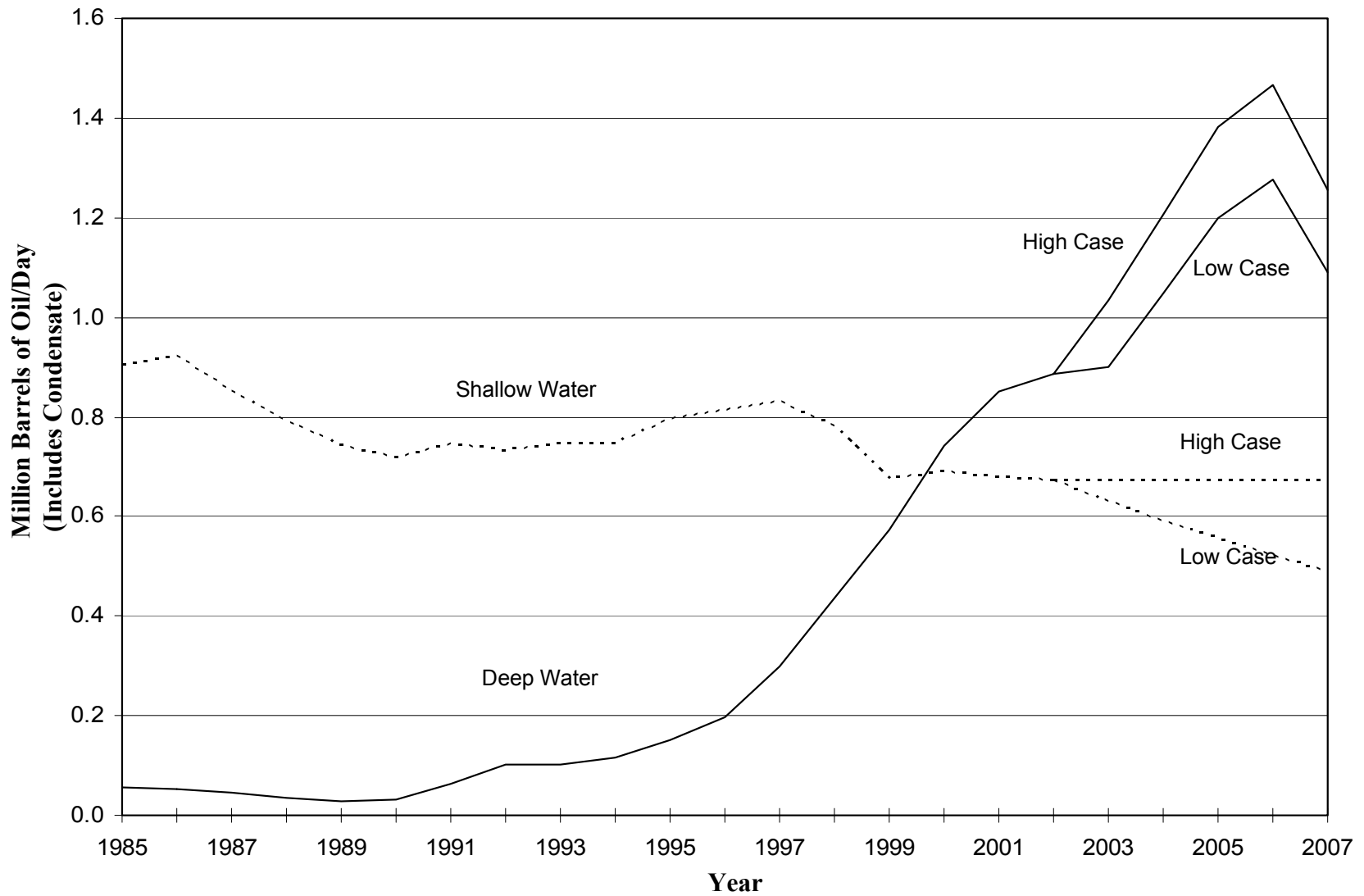


Figure 3. – Historical and Projected Oil Production Rates for Shallow- and Deepwater

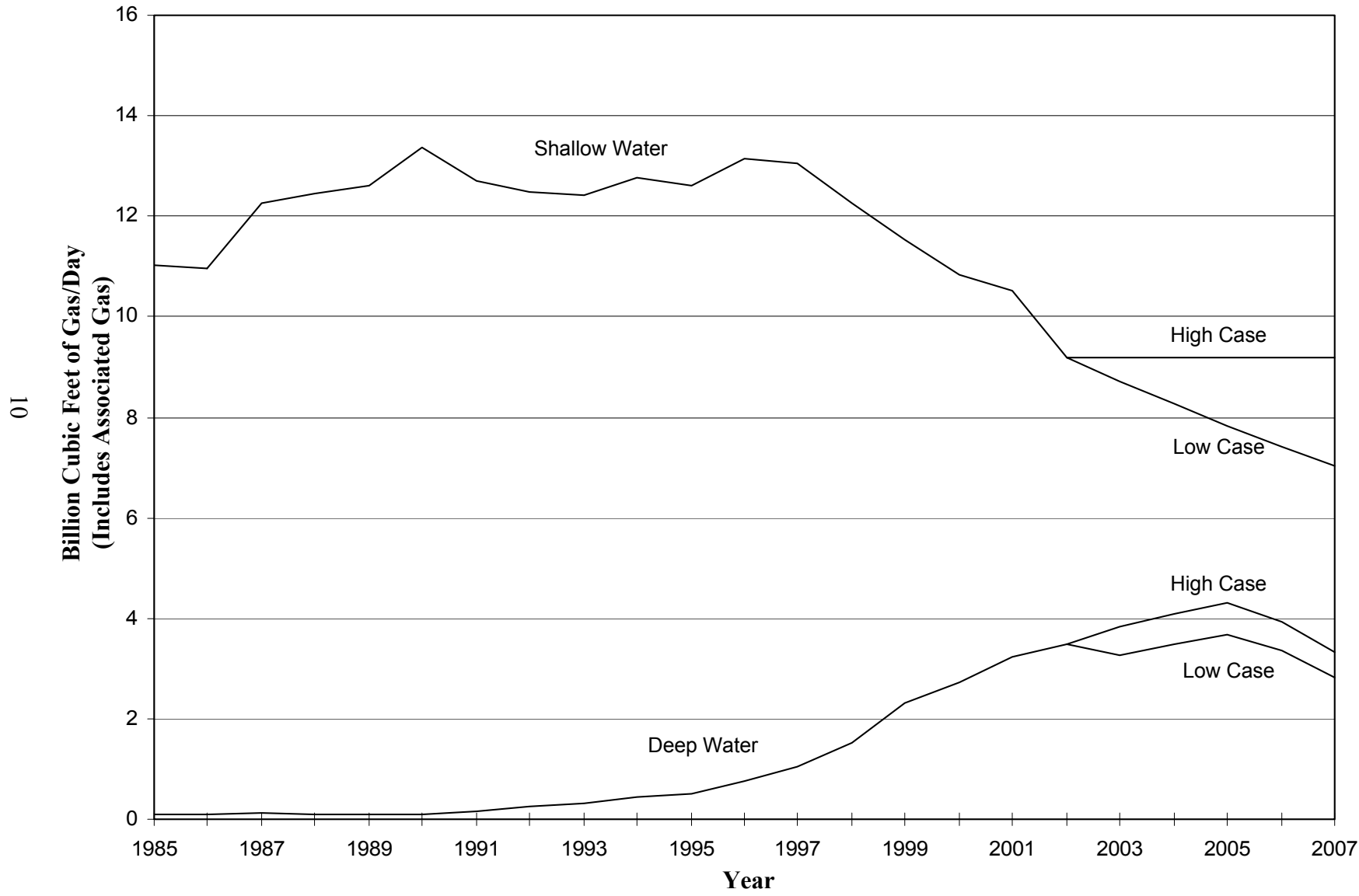


Figure 4. – Historical and Projected Gas Production Rates for Shallow- and Deepwater

Analysis

Last year's report, MMS 2002-031 (June 2002), projected yearend 2006 daily production rates of between 2,002 MBOPD and 2,478 MBOPD for oil and between 10.97 BCFPD and 16.39 BCFPD for gas. Ranging projections in this manner was necessary to account for the uncertainties in future production projections for currently producing fields. Our future production projections for the hundreds of currently producing fields are ranged because decline analysis alone may not accurately represent the effects of recompletions, new wells, workovers, etc., in offsetting field decline rates. Our projections for new fields (beginning production in 2003, 2004, etc.) are similarly ranged by applying error estimates ($\pm 7\%$ oil and $\pm 8\%$ gas) to operator predictions.

When this present report was formulated, October 2001 was the latest complete available month of production. The MMS Minerals Revenue Management office provided estimates of production for November 2001 through December 2002. The accuracy of these estimates is unknown.

Figures 5 and 6 provide a graphical comparison of the daily oil and gas production projections from the 2002 report and this report. The estimated 2002 production rates for oil are near the low end of the predicted range of last year's report. Estimated 2002 gas production rates are well below the predicted range of last year's report.

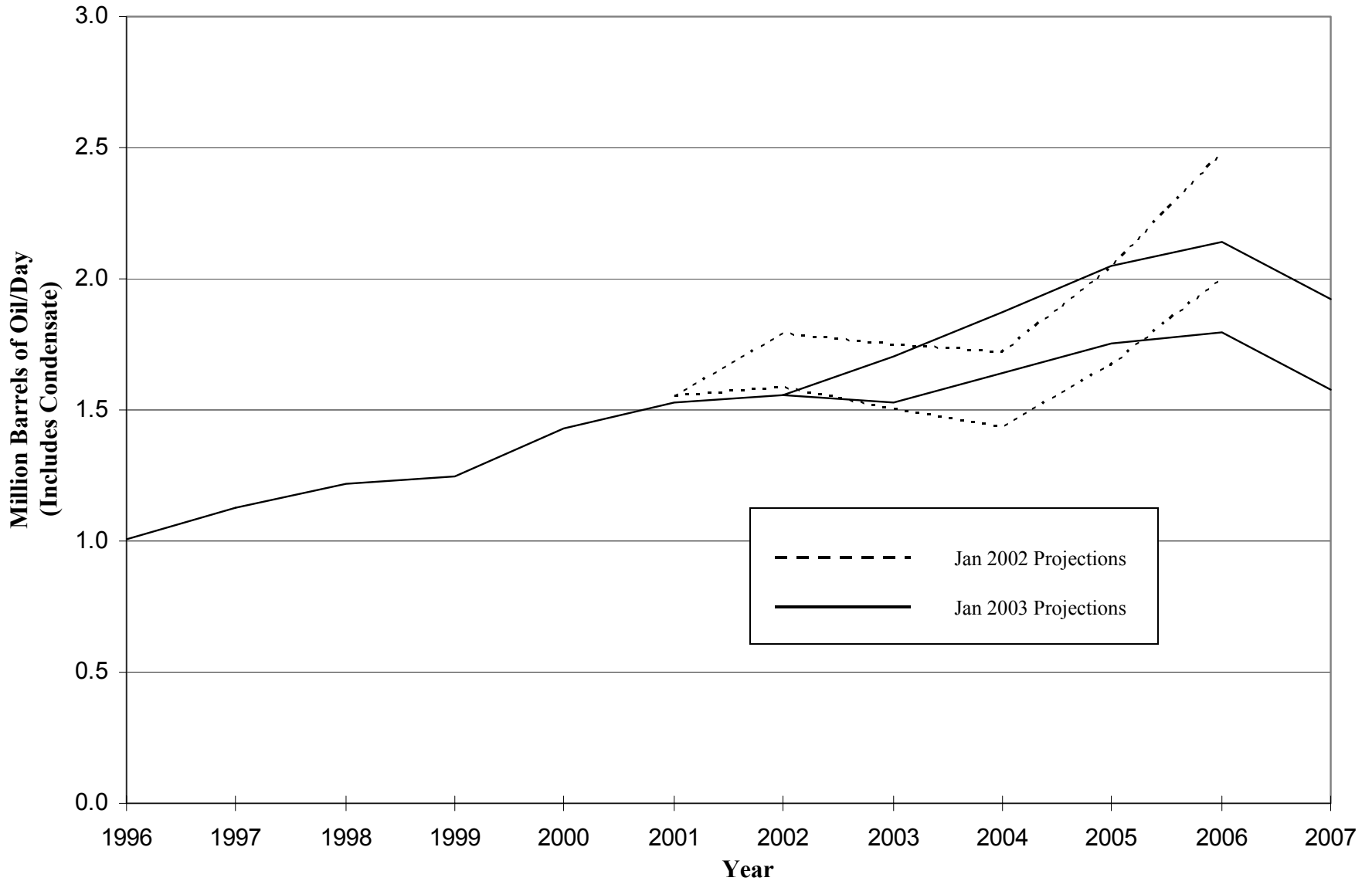


Figure 5. - Comparison of Current (January 2003) and Previous Oil Production Projections, Gulf of Mexico Region

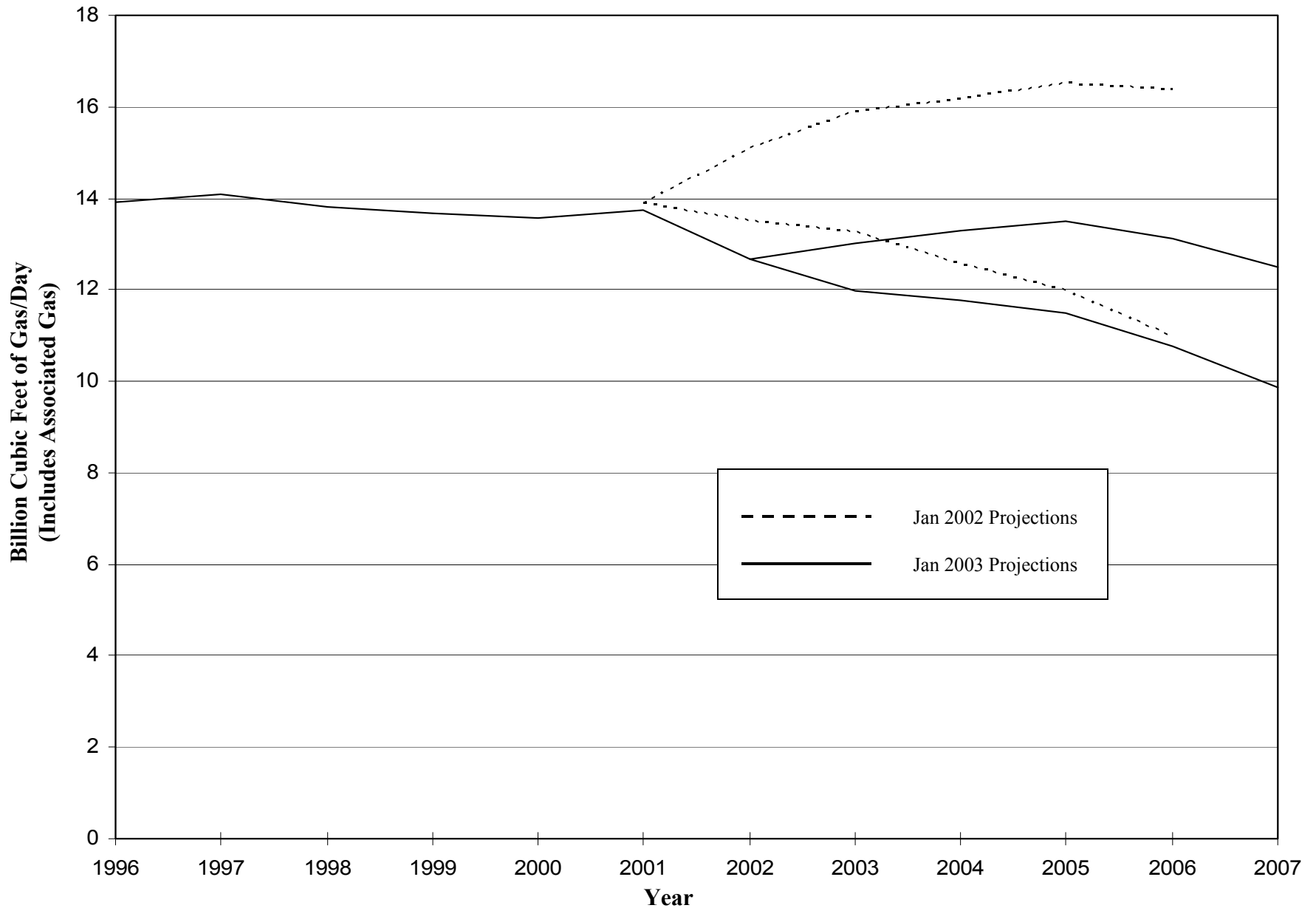


Figure 6. - Comparison of Current (January 2003) and Previous Gas Production Projections, Gulf of Mexico Region

Conclusions

Deepwater oil and gas production rates were at an all-time high in 2001 (latest complete data). Deepwater oil production continues to exceed shallow-water production. The projected deepwater oil production increases through 2006, with a decline in 2007. Similarly, projected deepwater gas appears to peak in 2005. Note that our previous reports showed similar declines in the latter years of the forecast, but subsequent reports shifted this peak. This decline may result from conservative operator estimates and the many uncertainties in making five-year projections.

The Gulf of Mexico OCS should increase its daily oil production from 1,010 MBOPD in 1996 to a range between 1,580 MBOPD and 1,926 MBOPD by yearend 2007. The 1996 daily gas production rate of 13.90 BCFPD should change to a range between 9.86 BCFPD and 12.51 BCFPD by yearend 2007.

The Deep Gas Initiative, which began with the lease sale of March 2001 (Sale 178), offers royalty-relief incentives on shallow-water (< 200 meters) gas production below 15,000 ft. subsea. In addition, a proposed Deep Gas Rule was published in the *Federal Register* on March 26, 2003, proposing royalty relief incentives (royalty suspension volumes) for gas production on existing leases below 15,000 ft. subsea (15 BCF) and 18,000 ft. subsea (25 BCF) and a royalty relief credit (royalty suspension supplement) of 5 BCF for unsuccessful wells drilled below 18,000 ft. subsea. This report does not reflect

the potential impact of these incentives because there are not enough data available yet to quantify their effect.

Furthermore, since the deepwater oil and gas projections are based on a survey of oil and gas lease operators, leases that begin production by the year 2007 are not identified in the survey will also increase oil and gas production beyond these projections.

By yearend 2007, production from deepwater fields (greater than or equal to 1,000 feet) will account for 69 percent of the daily oil production and 28 percent of the daily gas production in the low-case scenario, and 65 percent of the daily oil production and 26 percent of the daily gas production in the high-case scenario.

Contributors

This report includes contributions from the following Minerals Management Service personnel:

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BP America Production Company
Conoco Philips
ChevronTexaco Inc.
Dominion Exploration & Producing
EEX Corporation
El Paso Production
ExxonMobil Corporation
Kerr-McGee Corporation
Marathon Oil Company
Mariner Energy, Inc.
Murphy Exploration & Production Company
Pioneer Natural Resources USA, Inc.
Shell Offshore Inc.
TotalFinaElf E&P USA, Inc.
Walter Oil & Gas

References

Melancon, J. M., and Baud, R. D., 2000, *Gulf of Mexico Outer Continental Shelf Daily Oil and Gas Production Rate Projections From 2000 Through 2004*, U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, OCS Report MMS 2000-012, New Orleans, 20 p.

Melancon, J. M., Bongiovanni, R., and Baud, R. D., 2001, *Gulf of Mexico Outer Continental Shelf Daily Oil and Gas Production Rate Projections From 2001 Through 2005*, U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, OCS Report MMS 2001-044, New Orleans, 20 p.

Melancon, J. M., Bongiovanni, R., and Baud, R. D., 2002, *Gulf of Mexico Outer Continental Shelf Daily Oil and Gas Production Rate Projections From 2002 Through 2006*, U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, OCS Report MMS 2002-031, New Orleans, 26 p.

Notice

Please contact the Regional Supervisor, Production and Development, Gulf of Mexico OCS Region, Minerals Management Service, 1201 Elmwood Park Boulevard, New Orleans, Louisiana 70123, to communicate any questions you have or ideas for consideration in our next report. The telephone number is (504) 736-2675.



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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.



The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Minerals Revenue Management** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.