

Gulf of Mexico Outer Continental Shelf Daily Oil and Gas Production Rate Projections From 1998 Through 2002

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Table of Abbreviations

BCFPD	Billion cubic feet per day
BOPD	Barrels of oil per day
DOCD	Development Operations Coordination Document
DWRR	Deepwater Royalty Relief
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
POE	Plan of Exploration

Introduction

This paper provides daily oil and gas production rate projections for the Gulf of Mexico (GOM) Outer Continental Shelf (OCS) for the years 1998 through 2002. These projections represent daily oil and gas production estimates at calendar yearend.

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 is defined as a water depth greater than or equal to 1,000 feet.

This report differs from last year's report in that all figures and text use December average daily production rates for past years as opposed to calendar year averages. Since future production projections are based on calendar yearend rates (December), it

was determined that consistency in using yearend historical data would provide a more valid statistical comparison.

Further, since the publication of this report will occur in the first quarter of each calendar year, a decision was made to change the start of the 5-year projection cycle to the current year.

In addition to providing daily oil and gas production rate projections, we have included one figure and one table pertaining to leasing history and one table concerning exploration and development plan approvals. These are provided as supportive background information for our projections as well as information indicative of current interest and activity in the GOM deepwater environment.

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 1998-2002.

Change in Methodology from 1996 Report

The method used to predict shallow-water production rates for this report has changed from that used last year. The method used in preparing last year's report was dependent upon proved and unproved reserve estimates by field and involved performing a decline analysis on each producing shallow-water field, calculating a decline constant, and estimating a future decline rate. Production start dates for the discovered proved and unproved nonproducing fields in the shallow-water GOM were projected, and historical decline rates applied. Workload constraints within Minerals Management Service (MMS) have prevented reserve updates for all fields classified as proved and unproved through December 1997. Therefore, the basis for projecting production from currently producing fields had to be changed from the method employed last year. This year's method was based on performing a decline analysis of the total production rate from the shallow-water GOM.

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

1. 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. Once again, this year the high-case scenarios for both oil and gas assume that new technology (such as 3-D seismic data and horizontal wells) will offset currently producing field decline rates and GOM production will remain constant at the December 1996 daily rates of 1,047 thousand barrels of oil per day (MBOPD) and 14.1 billion cubic feet per day (BCFPD) through the year 2002. This appears to be a reasonable assumption considering that shallow-water oil and gas production rates have remained fairly constant over the last 20 years.

3. For the low case, if the cumulative shallow-water oil production rate should begin to decline, it will

decline at the same rate as observed during the period from 1986 through 1989 (the last period of declining oil rates) (8.2% per year), and even though the cumulative shallow-water gas production rate has not shown a period of sustained decline (over the last 20 years), it will begin to decline at the same time and at the same rate (8.2% per year) as the cumulative shallow-water oil production rate.

Low-case Production Rate Projections

The average daily low-case, shallow-water oil and gas production rates for December 1998 to 2002 were calculated using the actual average daily production rates for oil and gas in December 1996 and the decline rate determined above. The total projected average daily low-case production rates for December 1998 to 2002 were calculated by adding these declining shallow-water production rates to the estimated daily production rates for deepwater projects obtained from a survey of operators.

High-case Production Rate Projections

The average daily high-case production rates for December 1998 to 2002 were calculated by adding the shallow-water production rate, which is assumed to be constant at December 1996 levels, to the estimated daily production rates for deepwater projects obtained from a survey of operators.

Table 1 presents a listing of the 52 deepwater fields on production or projected to commence production through the year 2002, including the date of first production, water depth, and daily oil and gas production capacities in those cases where this information may be released to the public.

We point out the significant daily production capacity estimates for a few of the Table 1 fields like Mars (100,000 barrels of oil per day [BOPD], 100 million cubic feet per day [MMCFPD]), Ursa (150,000 BOPD, 400 MMCFPD), Petronius (60,000 BOPD, 100 MMCFPD), Ram Powell (60,000 BOPD, 200 MMCFPD), Mensa (300 MMCFPD), Auger (90,000 BOPD, 240 MMCFPD), Tahoe/Tahoe II (17,000 BOPD, 300 MMCFPD), Genesis (55,000 BOPD, 72 MMCFPD), Troika (80,000 BOPD, 140 MMCFPD), and Allegheny (25,000 BOPD, 35 MMCFPD) as examples of the major impact deepwater fields now have and will continue to have on future daily GOM production rates.

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.

Undiscovered fields in any water depth coming on production by the year 2002 will further increase these daily production totals.

Table 1. — Deepwater Fields on Production or Expected to Commence Production by Yearend 2002						
				Year of First	Production Capacity	
Operator(s)	Field Name	Block	Water Depth	Production	Oil (B/D)	Gas (MCF/D)
Amerada Hess	Baldpate	GB 260	1,641	1998	48,000	152,000
Amoco Production	King's Peak	DC 133	6,530	2001	Unreleasable	Unreleasable
Amoco Production	King	MC 084	5,149	Unreleasable	Unreleasable	Unreleasable
Amoco Production	Marlin	VK 915	3,236	1999	40,000	250,000
BP Exploration	Neptune (AT)	AT 575	6,220	Unreleasable	Unreleasable	Unreleasable
BP Exploration	Troika	GC 244	2,721	1997	80,000	140,000
BP Exploration	AmberJack	MC 109	1,029	1991	12,700	12,700
BP Exploration	Pompano/Pompano II	VK 990	1,290	1994	52,000	61,000
British-Borneo	Morpeh/Klamath	EW 921	1,673	Unreleasable	Unreleasable	Unreleasable
British-Borneo	Allegheny	GC 254	3,186	1999	25,000	35,000
Chevron	Genesis	GC 205	2,599	1999	55,000	72,000
Conoco	Jolliet	GC 184	1,720	1989	15,000	65,000
Elf	Virgo	VK 823	1,132	Unreleasable	Unreleasable	Unreleasable
Enserch	Cooper	GB 387	2,136	1995	10,000	16,000
Exxon	Hoover	AC 25/26	4,795	2000	Unreleasable	Unreleasable
Exxon	Diana	EB 945	4,634	2000	Unreleasable	Unreleasable
Exxon	Lena	MC 281	1,018	1984	27,000	61,000
Exxon	Zinc	MC 354	1,478	1993	500	120,000
Exxon & Enserch & Walter	Alabaster	MC 397	1,059	1992	7,000	155,000
Marathon	Arnold	EW 963	1,749	Unreleasable	Unreleasable	Unreleasable
Marathon	Oyster	EW 917	1,185	Unreleasable	Unreleasable	Unreleasable
Oryx	Diamond	MC 445	2,095	1993	200	36,000
Oryx	Neptune/Thor	VK 825	1,861	1997	25,000	40,000
Reading & Bates	East Boomvang	EB 688	3,767	Unreleasable	Unreleasable	Unreleasable
Shell	Auger	GB 426	2,864	1994	90,000	240,000
Shell	Serrano	GB 516	3,153	Unreleasable	Unreleasable	Unreleasable
Shell	Macaroni	GB 602	3,600	Unreleasable	Unreleasable	Unreleasable
Shell	Bullwinkle	GC 065	1,329	1989	57,000	101,000
Shell	Rocky	GC 110	1,621	1996	5,500	7,000
Shell	Popeye	GC 116	2,068	1996	8,000	145,000
Shell	Brutus	GC 158	2,877	Unreleasable	Unreleasable	Unreleasable
Shell	King Kong	GC 473	3,800	Unreleasable	Unreleasable	Unreleasable
Shell	Cognac	MC 194	1,023	1979	83,000	129,000
Shell	Mensa	MC 731	5,327	1997	0	300,000
Shell	Mars	MC 807	2,958	1996	100,000	100,000
Shell	Ursa	MC 810	3,928	1999	150,000	400,000
Shell	Europa	MC 935	3,889	Unreleasable	Unreleasable	Unreleasable
Shell	Tahoe/Tahoe II	VK 783	1,395	1994	17,000	300,000
Shell	Ram Powell	VK 956	3,214	1997	60,000	200,000
Tatham	Seattle Slew	EW 914	1,019	1993	3,000	13,000
Tatham	Sunday Silence	EW 958	1,450	1999	Unreleasable	Unreleasable
Texaco	Fuji	GC 506	4,275	2002	Unreleasable	Unreleasable
Texaco	Gemini	MC 292	3,763	1999	Unreleasable	Unreleasable
Texaco	Petronius	VK 786	1,753	1999	60,000	100,000
Vastar	King	MC 764	3,300	Unreleasable	Unreleasable	Unreleasable
Walter Oil & Gas	UNNAMED	EW 1006	1,882	Unreleasable	Unreleasable	Unreleasable
Walter Oil & Gas	UNNAMED	GB 179	1,100	Unreleasable	Unreleasable	Unreleasable
Walter Oil & Gas	UNNAMED	MC 443	2,095	Unreleasable	Unreleasable	Unreleasable
Walter Oil & Gas	UNNAMED	MC 533	1,000	Unreleasable	Unreleasable	Unreleasable
Walter Oil & Gas	UNNAMED	MC 837	3,900	Unreleasable	Unreleasable	Unreleasable
Walter Oil & Gas	UNNAMED	VK 862	1,043	1995	3,000	4,500
Unreleasable	Unreleasable	Green Canyon	1,500	Unreleasable	Unreleasable	Unreleasable

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

	1998	1999	2000	2001	2002
Low Oil MBOPD* (Decline Used)	1,226	1,493	1,592	1,606	1,666
High Oil MBOPD* (No Decline Used)	1,347	1,667	1,816	1,874	1,976
Low Gas BCFPD** (Decline Used)	13.27	13.43	13.39	12.83	12.43
High Gas BCFPD** (No Decline Used)	15.26	16.30	17.07	17.25	17.54

*Oil in MBOPD includes condensate.

**Gas in BCFPD includes associated or casinghead gas.

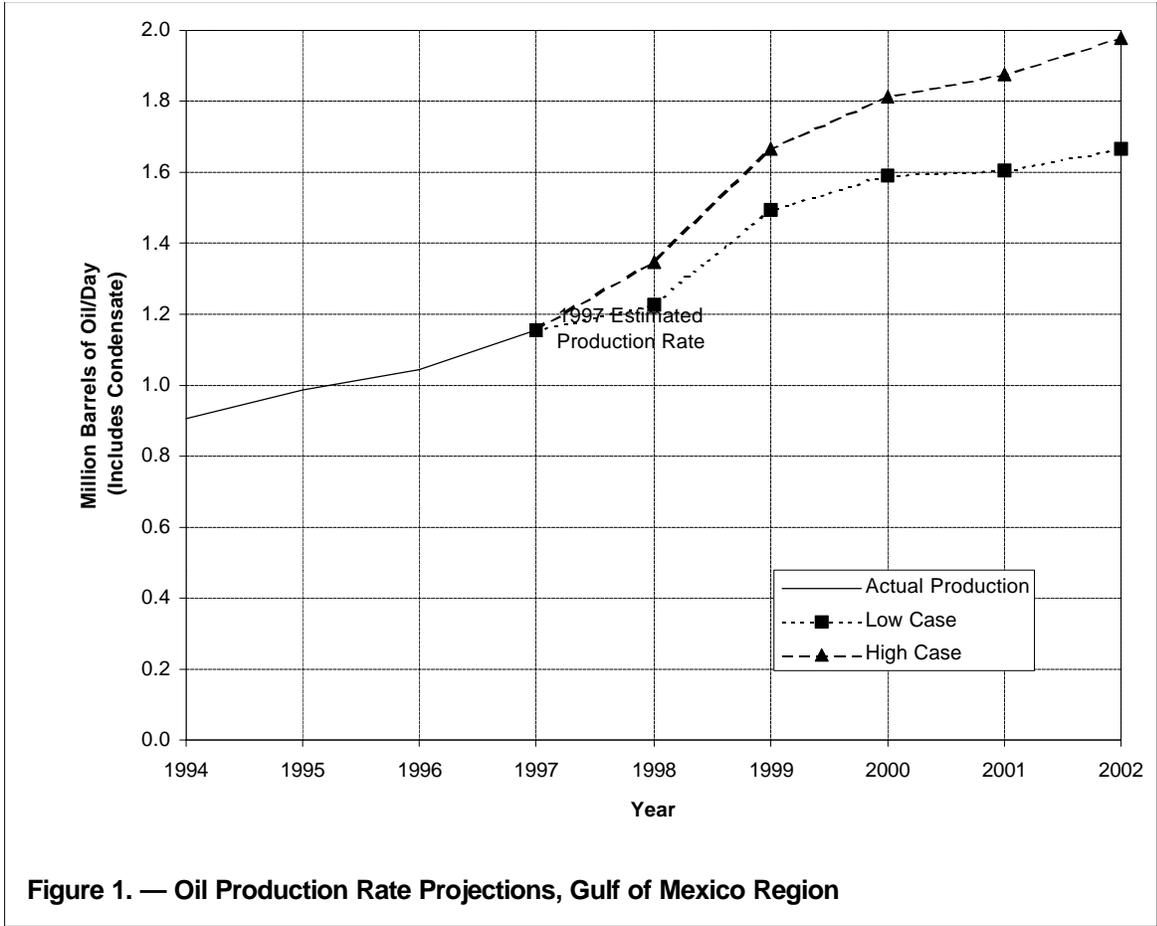
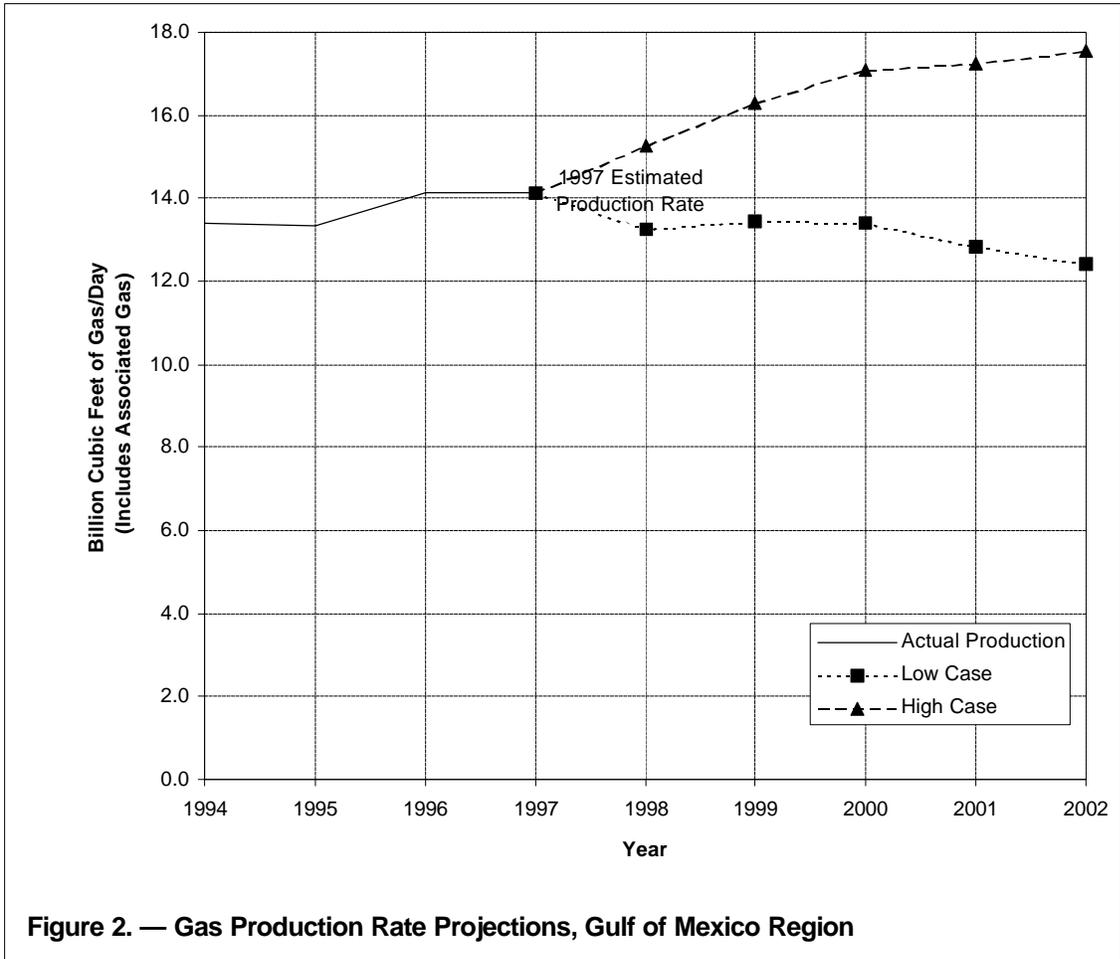


Figure 1. — Oil Production Rate Projections, Gulf of Mexico Region



Analysis

Last year's report, MMS 97-0006 (January 1997), projected yearend 2000 daily production rates of between 1,660 MBOPD and 1,932 MBOPD for oil and between 12.02 BCFPD and 17.20 BCFPD for gas. Ranging projections in this manner was necessary to account for the uncertainties in future production projections for currently producing fields. In essence, our projections for new fields commencing production in 1998, 1999, etc., are single-point estimates, while 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.

The projected December 1996 daily production rates in last year's report were 1,097 MBOPD for oil and 13.82 BCFPD for gas. Actual December 1996 production averages were 1,047 MBOPD for oil and 14.14 BCFPD for gas. Therefore, the actual December 1996 daily oil production rate was 50,000 BOPD less than our low-case projection, while the actual December 1996 daily gas production rate was 320 MMCFPD higher than our low-case projection.

When this report was being formulated, June 1997 was the latest complete available month of production. Therefore, we cannot compare December 1997 actual production to the December 1997 projections in last year's report, which were between 1,230 and 1,300 MBOPD for oil and between 13.32 and 15.80 BCFPD for gas. However, the actual daily production rates for the latest month,

June 1997, are 1,115 MBOPD for oil and 13.98 BCFPD for gas. Additionally, Ram Powell began producing in September 1997 and Troika in November 1997. The operators of these properties provided preliminary production numbers for December 1997 of 15 MBOPD and 93 MMCFPD for Ram Powell and 25 MBOPD and 38 MMCFPD for Troika. When these rates are added to the June 1997 actual production data, an approximation of December 1997 actual rates could be 1,155 MBOPD and 14.11 BCFPD if production from June is comparable to December otherwise. A comparison of last year's reported low-case production projection for December 1997 and the above-calculated December 1997 approximation results in a daily production rate for oil that is 75 MBOPD less than the low-case projection and 791 MMCFPD greater than the low-case projection.

We found the December 1996 and 1997 projected daily oil rates to be higher than the actual December 1996 and approximated December 1997 daily oil rates. Accordingly, we decided to credit only one-half of the facility capacity in the first year of production and ramp up to the full capacity in the second year in this year's report. We believe this procedure will more accurately reflect actual deepwater production scenarios.

Figures 3 and 4 provide a graphical presentation comparing the daily oil and gas production projections from last year's report and this report.

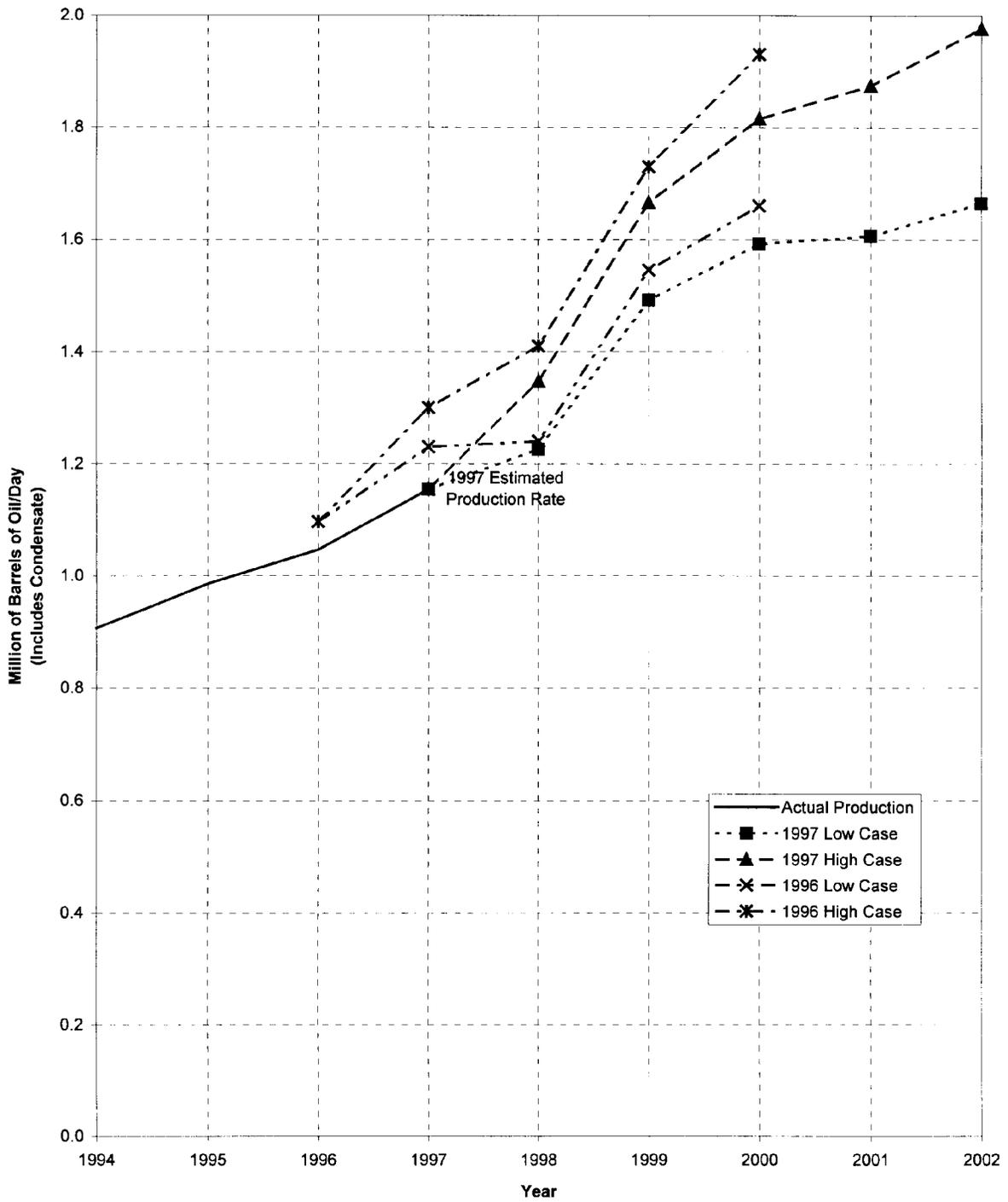


Figure 3. — Comparison of 1997 and 1996 Oil Production Rate Projections, Gulf of Mexico Region

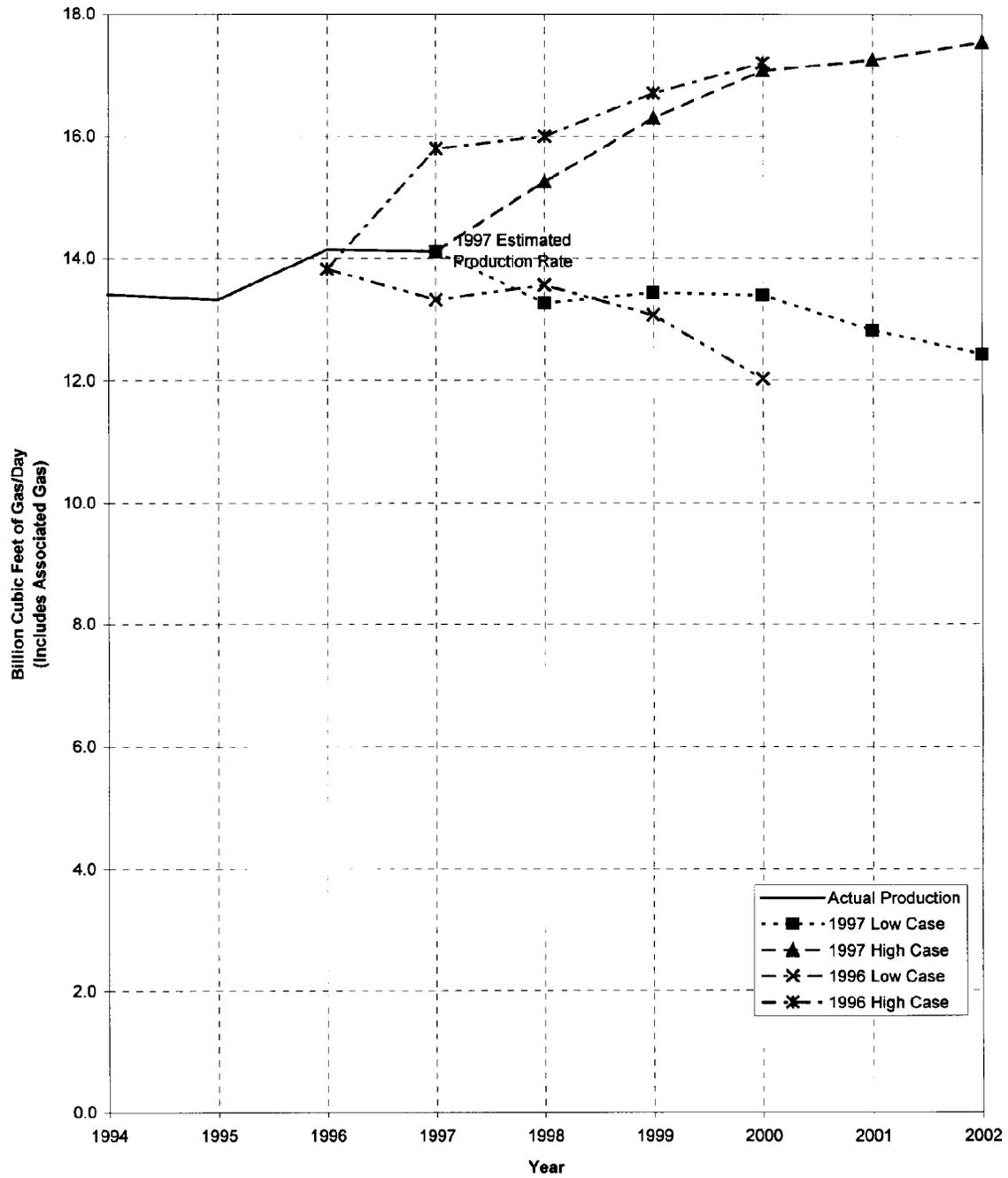


Figure 4. — Comparison of 1997 and 1996 Gas Production Rate Projections, Gulf of Mexico Region

Leasing and Development Plan Activity

The total number of tracts receiving bids in the Gulf of Mexico OCS over the last 10 years demonstrates a dramatic increase since 1995. This increase is evident in Figure 5, which indicates that 863 tracts were bid upon in 1995, 1,541 in 1996, and 1,836 in 1997. Total tracts bid upon during these three years total 4,240 as opposed to 4,639 bid upon during the previous seven years.

The large increase in bidding activity beginning in 1996 is partly attributable to the passage of Public Law 104-58, Title III, the OCS Deepwater Royalty Relief (DWRR) Act, signed on November 25, 1995. It is apparent from Table 3 that, although there was increased bidding activity in all water depth categories in 1996 and 1997, the largest increase by far was in water depths > 800 meters.

It should be pointed out that, in addition to the positive effects of the OCS Deepwater Royalty Relief Act upon industry bidding strategies, several

other factors such as high oil and gas production rates from deepwater reservoirs, the evolution of economic deepwater development technology, favorable oil and gas prices, and the reduced risk of deepwater exploratory and development drilling, among other factors, have also had a significant impact.

Development plan approvals increased substantially from 1993 through the end of 1997, as illustrated in Table 4. In calendar year 1996, exploratory plan approvals (415) increased 28 percent and development plan approvals (345) increased 36 percent over calendar year 1995 totals. Calendar year 1997 exploratory plan approvals (439) and development plan approvals (370) represent increases of 35 percent and 46 percent over calendar year 1995 totals and increases of 6 percent and 7 percent over calendar year 1996 totals, respectively.

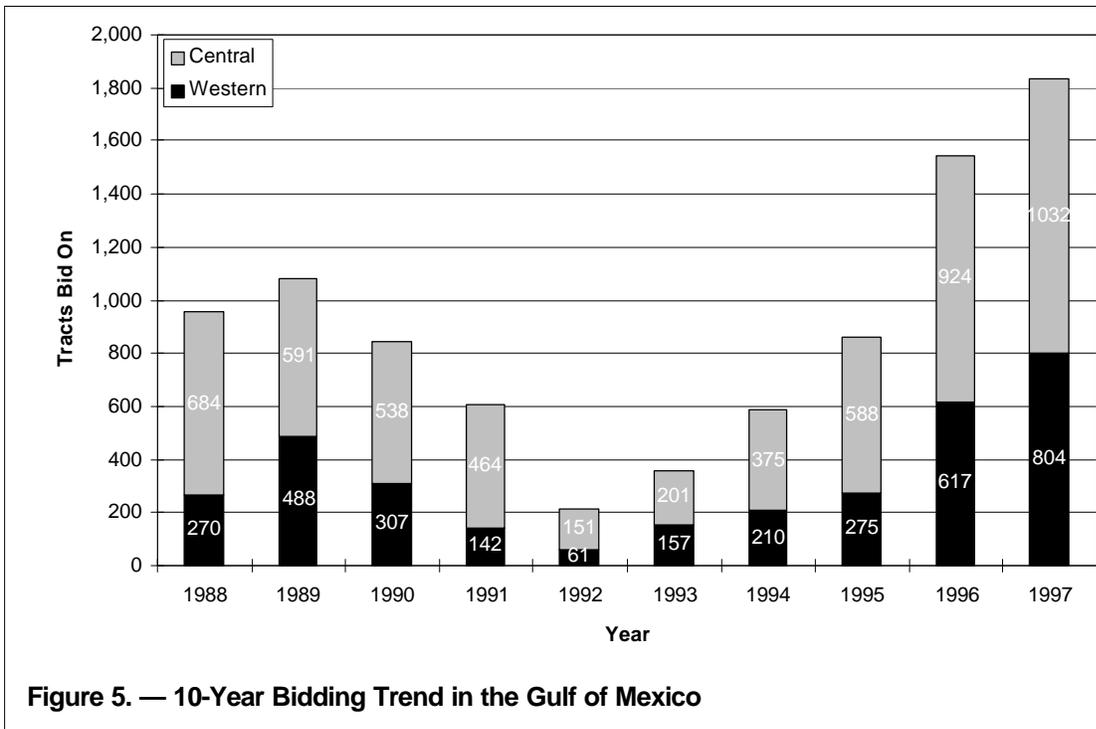


Table 3.
Gulf of Mexico OCS Bids 1994-1997; Before and After Royalty Relief (Sales 157, 161, 166, and 168 Include Royalty Relief)

Water Depth	1994 Sales 147 & 150	1995 Sales 152 & 155	1996 Sales 157 & 161	1997 Sales 166 & 168
<200M	490	516	637	542
200-400M	18	50	69	52
400-800M	28	83	113	104
>800M	49	214	722	1,138
	585	863	1,541	1,836

Table 4.
Plans of Exploration (POE) and Development Operations Coordination Documents (DOCD) by Calendar Year

Calendar Year	POE's Approved	DOCD's Approved
1990	485	223
1991	365	179
1992	250	128
1993	318	187
1994	345	282
1995	325	253
1996	415	345
1997	439	370

Conclusions

The Gulf of Mexico OCS should increase its 1995 daily oil production from 945 MBOPD to a range between 1,592 MBOPD and 1,816 MBOPD by yearend 2000 and between 1,666 MBOPD and 1,976 MBOPD by yearend 2002. The 1995 daily gas production rate of 13.09 BCFPD should change to a range from 13.39 BCFPD to 17.07 BCFPD by yearend 2000 and between 12.43 BCFPD and 17.54 BCFPD by yearend 2002. Given that gas reservoirs are less expensive to develop and that it is currently economical to subsea-complete some isolated gas wells with

tiebacks, our gas production rate projections may prove conservative. Stated another way, this report may not account for several future gas development projects, the sum of which may be significant. By the yearend 2000, production from deepwater fields (> 1,000 feet) will account for 64 percent of the daily oil production and 30 percent of the daily gas production in the low case and 56 percent of the daily oil production and 23percent of the daily gas production in the high case.

Contributing Personnel

This report includes contributions from the following GOM Office of Production and Development personnel:

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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.



The Department of the Interior Mission

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 Royalty Management Program** 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.

**Minerals Management Service
Gulf of Mexico Region**



**Managing America's offshore energy
resources**

**Protecting America's coastal
and marine environments**