

Gulf of Mexico Outer Continental Shelf Daily Oil and Gas Production Rate Projections From 1996 Through 2000

January 1997

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Introduction

This paper provides daily oil and gas production rate projections for the Gulf of Mexico (GOM) Outer Continental Shelf (OCS) for the years 1996 through 2000. These projections represent daily oil and gas production estimates at calendar yearend.

There have been numerous published articles concerning, in particular, daily oil production rate increases by the year 2000 as a result of many deepwater GOM fields coming on production. The Minerals Management Service Gulf of Mexico OCS Region determined that an independent evaluation of daily oil and gas production projections was desirable for both MMS decisionmaking and to keep the industrial and public sectors informed.

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.

In addition to providing the daily oil and gas production rate projections, we have included one figure and one table pertaining to leasing history and two tables concerning development plan approvals. These are provided as supportive background information for our projections as well as information indicative of future 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 1996-2000. These projections were generated as follows:

- Two different projections of production rates through the year 2000 were generated to represent production from currently producing fields in shallow water (less than 1,000 ft. depth).
 - To calculate low-end production projections for currently producing fields in shallow water, 10 years of production data by year were downloaded, and a linear regression performed on all points to estimate an exponential decline constant for each producing field. A regression analysis was also performed on all points after maximum production to calculate a decline constant. Another decline constant was generated by filtering out the bad points. These decline constants, along with reserves/ production ratios, were then used to calculate low-range projected production estimates as they declined through the year 2000.
 - To calculate high-end production rate projections for shallow-water fields producing at present, it was assumed that new technology (such as 3-D seismic data and horizontal wells) would offset currently producing field decline rates, and GOM production would remain constant at its present rates of about 856 MBOPD and 13.9 Bcfd through the year 2000.
 - In both the above cases, nonproducing, discovered shallow-water fields with unproved reserves were scheduled for production and production profiles established based upon GOM historical field life data.
- Next, production rate projections for 40 deepwater fields now producing or expected to commence production by calendar yearend 2000 were obtained from the operators and from other sources such as oil and gas publications and the Internet. Table 1 presents a listing of the 40 fields on production or projected to commence production through the year 2000, 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 BOPD, 110 MMcfd), Ursa (150,000 BOPD, 400 MMcfd), Petronius (60,000 BOPD, 100 MMcfd), Ram Powell (60,000 BOPD, 200 MMcfd), Mensa (300 MMcfd), Auger (70,000 BOPD, 120,000 MMcfd), Tahoe/Tahoe II (300 MMcfd), Genesis (55,000 BOPD, 72 MMcfd), Troika (80,000 BOPD, 140 MMcfd), and Allegheny (70,000 BOPD, 70 MMcfd) as examples of the major impact deepwater fields now have and will continue to have on future daily GOM production rates.

The deepwater production rate projections from the fields listed in Table 1 were then added to the two shallow-water sets of rate projections to generate high- and low-range projections for production rates in the GOM through the year 2000. Table 2 and Figures 1 and 2 provide these 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 2000 will further increase these daily production totals.

Table 1

Deep-Water Fields on Production or Expected to Commence Production by Yearend 2000

Operator	Field Name	Block	Water Depth	Year of First Production	Production Oil (B/D)	Capacity Gas (MCFD)
Amoco Production	King's Peak	MC 217	6,800	1999	Unreleasable	Unreleasable
Amoco Production	Marlin	VK 915	3,236	Unreleasable	Unreleasable	Unreleasable
BP Exploration	Not Named	MC 718	2,786	Unreleasable	Unreleasable	Unreleasable
BP Exploration	Amberjack	MC 109	1,029	1991	12,700	12,700
BP Exploration	Pompano	VK 990	1,483	1994	33,100	33,100
BP Exploration	Pompano II	MC 028	N/A	1996	27,300	27,300
BP Exploration	Troika	GC 244	2,721	1997	80,000	140,000
British-Borneo	Klamath	EW 921	1,630	Unreleasable	Unreleasable	Unreleasable
Chevron	Genesis	GC 205	2,599	1999	55,000	72,000
Conoco	Jolliet	GC 184	1,720	1989	6,000	27,000
Enserch	Alabaster	MC 397	1,059	1993	-	35,000
Enserch	Allegheny	GC 254	3,186	1998	70,000	70,000
Enserch	Cooper	GB 387	2,135	1995	40,000	120,000
Exxon	Alabaster	MC 397	1,059	1993	-	102,000
Exxon	Diana	EB 945	4,634	Unreleasable	Unreleasable	Unreleasable
Exxon	Lena	MC 281	1,017	1984	-	42,000
Exxon	Zinc	MC 354	1,478	1993	-	144,000
Flextrend	Spendabuck*	GB 117	978	1996	8,000	12,000
Oryx	Not Named	MC 445	2,095	1993	-	21,900
Oryx	Thor/Neptune	VK 825	1,851	1997	25,000	30,000
Phillips Petroleum	Mahogany*	SS 359	370	1996	45,000	100,000
Shell	Auger	GB426	2,864	1994	70,000	120,000
Shell	Bullwinkle/Rocky	GC 065	1,352	1989	30,000	40,000
Shell	Cognac	MC 194	1,023	1979	12,000	160,000
Shell	Mars	MC 807	2,958	1996	100,000	110,000
Shell	Mensa	MC 731	5,376	1997	-	300,000
Shell	Popeye	GC 116	2,068	1996	4,000	120,000
Shell	Ram Powell	VK 956	3,255	1997	60,000	200,000
Shell	Tahoe/Tahoe II	VK 783	1,395	1994	17,000	300,000
Shell	Ursa	MC 854	4,021	1999	150,000	400,000
Tatham	Seattle Slew	EW 914	1,019	1993	1,400	2,800
Tatham	Sunday Silence	EW 958	1,450	Unreleasable	Unreleasable	Unreleasable
Texaco	Fuji	GC 506	4,275	Unreleasable	Unreleasable	Unreleasable
Texaco	Gemini	MC 292	3,405	Unreleasable	Unreleasable	Unreleasable
Texaco	Petronius	VK 786	1,753	1999	60,000	100,000
Texaco	Shasta*	GC 136	976	1995	504	50,360
Walter Oil	Not Named	VK 862	1,043	1995	2,500	2,500
Walter Oil	Not Named	MC 837	N/A	Unreleasable	Unreleasable	Unreleasable
Unreleasable	Unreleasable	GC	2,000+	1998	Unreleasable	Unreleasable
Unreleasable	Unreleasable	MC	3,000+	2000	Unreleasable	Unreleasable

*Note: Project is in shallow water (<1,000 ft), but considered a significant new field, and tabulated with the deep-water annual production projections.

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

	1996	1997	1998	1999	2000
Low Oil MBOPD* (Decline Used)	1,097	1,230	1,240	1,545	1,660
High Oil MBOPD* (No Decline Used)	1,097	1,300	1,407	1,730	1,932
Low Gas Bcfd** (Decline Used)	13.82	13.32	13.56	13.07	12.02
High Gas Bcfd** (No Decline Used)	13.82	15.80	16.00	16.70	17.20

*Oil in MBOPD includes condensate.

**Gas in BCFPD includes associated or casinghead gas.

Figure 1

OIL PRODUCTION RATE PROJECTIONS GULF OF MEXICO REGION

In Million Barrels Oil/Day

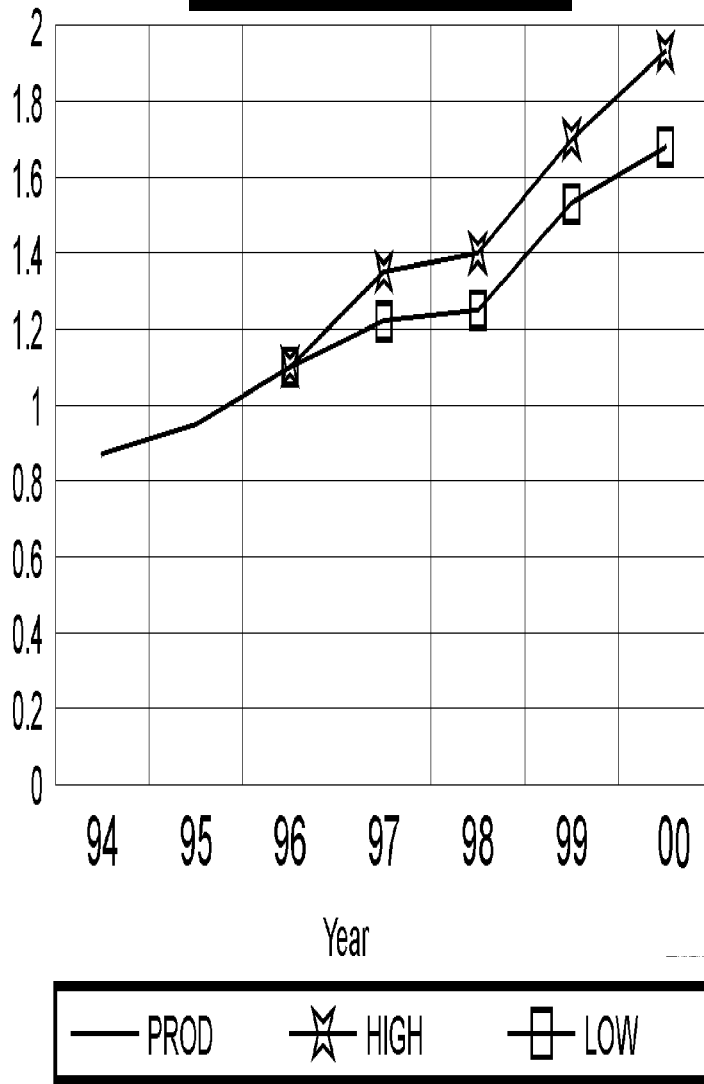
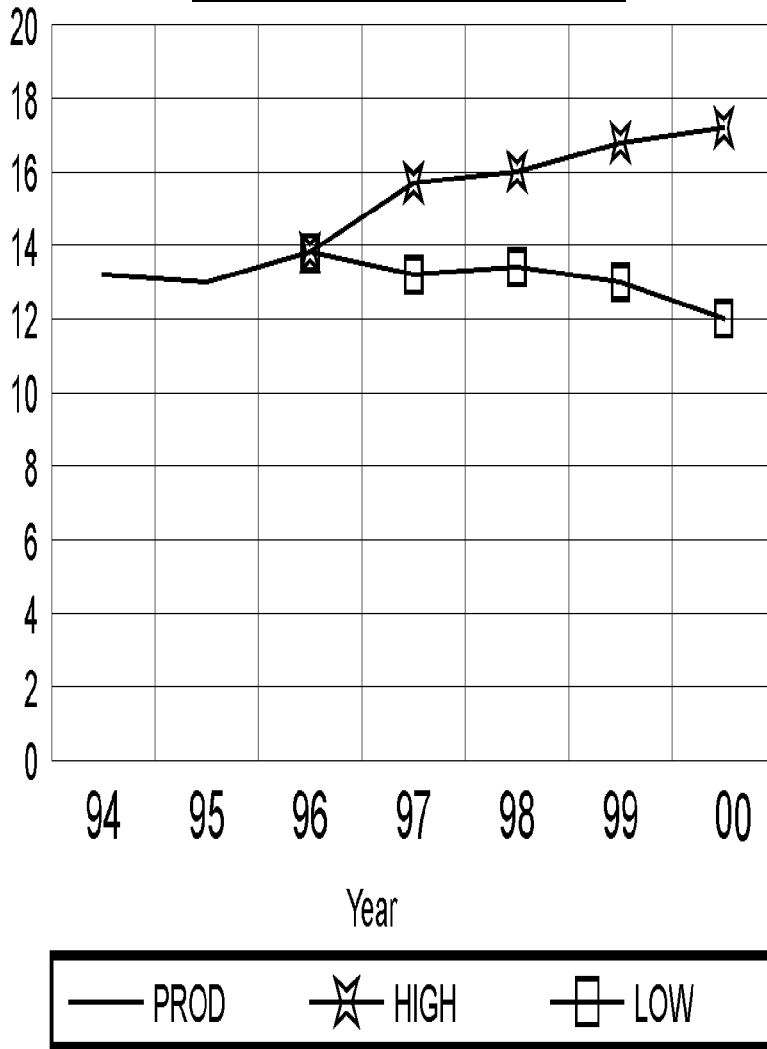


Figure 2

GAS PRODUCTION RATE PROJECTIONS GULF OF MEXICO REGION

In Billion Cubic Feet Gas/Day



Leasing and Development Plan Activity

The total number of tracts receiving bids in the Gulf of Mexico OCS over the last 10 years demonstrated a dramatic increase in the 1995-1996 two-year period. This increase is evident in Figure 3, which indicates the 2,404 tracts that were bid upon during this period. The two-year period covering 1989-1990 included 1,924 tracts receiving bids, but the 1991-1992 and the 1993-1994 two-year periods had only 818 and 943 tracts receiving bids, respectively.

The large increase in bidding activity 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, and in effect for Sales 157 (April 24, 1996) and 161 (September 25, 1996). It is apparent from Table 3 that, although there was increased bidding activity in all water depth categories in 1996, 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 Outer Continental Shelf

DWRR 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, 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 1996, as illustrated in Table 4. In calendar year 1996, exploratory plan approvals increased 28 percent, and development plan approvals increased 36 percent over calendar year 1995 totals. The 1996 number of DOCD's approved (345) is the highest number approved in any recent calendar year. There are 363 blocks listed on Table 5 associated with the 345 DOCD's approved in calendar year 1996.

10 Year Bidding Trend in the Gulf of Mexico

Tracts Bid On

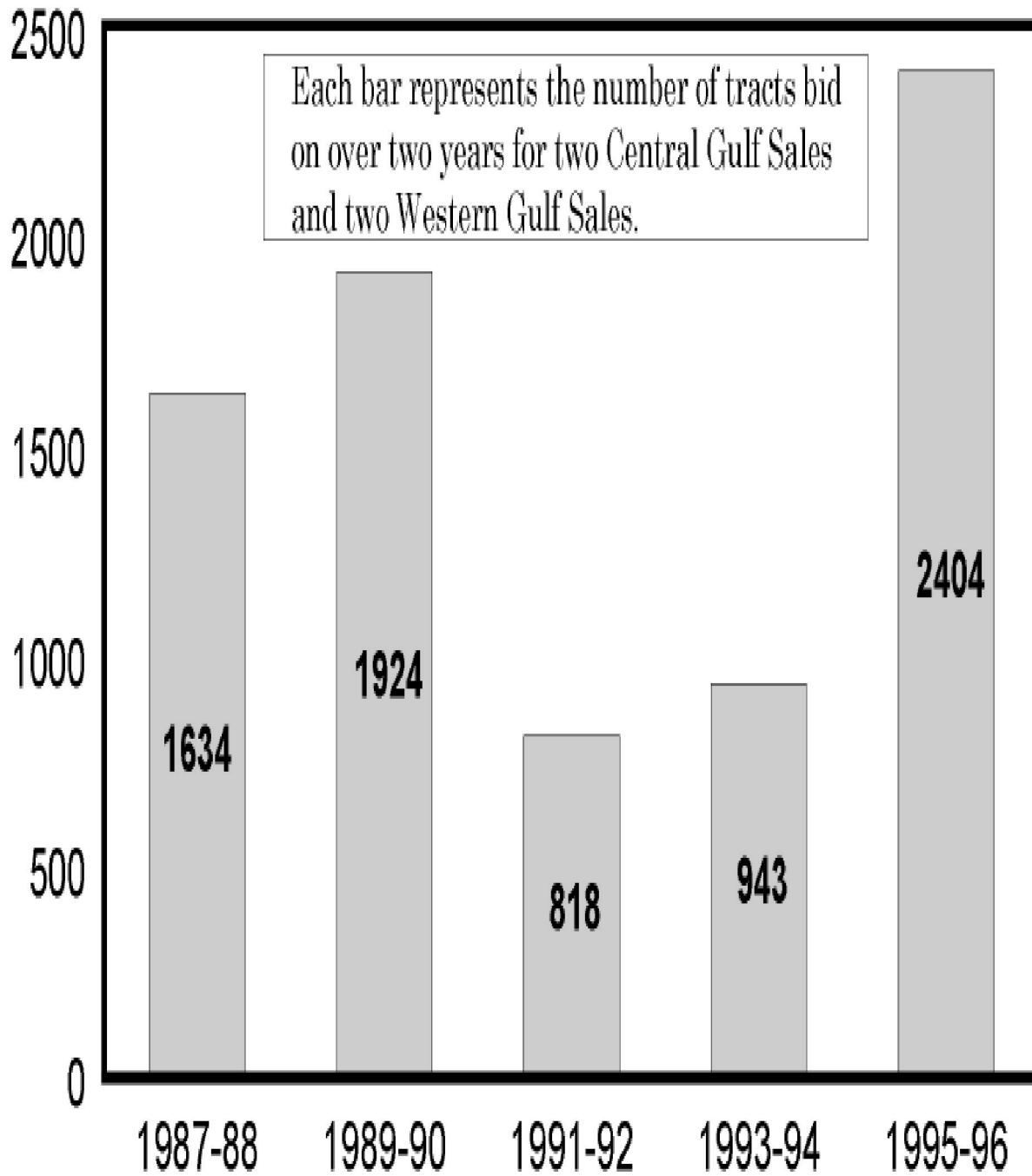


Table 3.—Gulf of Mexico OCS Bids 1994-1996; Before and After Royalty Relief (Sales 157 and 161 Include Royalty Relief)

Water Depth	1994 Sales 147 and 150	1995 Sales 152 & 155	1996 Sales 157 & 161	3-Year Total
<200M	490	516	637	1,643
200-400M	18	50	69	137
400-800M	28	83	113	224
>800M	49	214	722	985

Table 4.—Plans of Exploration 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

Table 5.—Blocks with DOCD’s Approved in Calendar Year 1996

Area/ Block	Area/ Block	Area/ Block	Area/ Block	Area/ Block
BA 0377	EI 0042	EW 0991	HI A0513	MP 0225
BA 0397	EI 0044	EW 1003	HI A0518	MP 0249
BA 0431	EI 0064	GA 0209	HI A0519	MP 0250
BA 0432	EI 0071	GA 0211	HI A0528	MP 0252
BA 0455	EI 0072	GA 0297	HI A0549	MP 0262
BA 0494	EI 0074	GA 0303	HI A0553	MP 0263
BA 0552	EI 0088	GA 0330	HI A0556	MP 0298
BA A0021	EI 0095	GA 0362	HI A0557	MP 0299
BA A0047	EI 0107	GA 0391	HI A0568	MP 0301
BA A0052	EI 0110	GA 0394	MC 0357	MU 0785
BA A0053	EI 0118	GA 0395	MC 0661	MU A0031
BS 0055	EI 0128	GA 0420	MC 0705	PL 0023
CA 0021	EI 0133	GA A0034	MC 0807	PL 0025
CA 0040	EI 0147	GA A0035	MI 0566	SA 0009
EB 0112	EI 0158	GB 0117	MI 0589	SA 0012
EB 0157	EI 0175	GB 0259	MI 0632	SM 0010
EC 0042	EI 0187	GB 0260	MI 0633	SM 0011
EC 0047	EI 0208	GI 0032	MI 0651	SM 0017
EC 0048	EI 0215	GI 0047	MI 0656	SM 0024
EC 0049	EI 0216	GI 0078	MI 0665	SM 0048
EC 0067	EI 0219	GI 0082	MI 0672	SM 0049
EC 0082	EI 0224	GI 0091	MO 0819	SM 0066
EC 0083	EI 0229	GI 0102	MO 0861	SM 0069
EC 0129	EI 0238	GI 0104	MO 0869	SM 0070
EC 0149	EI 0242	HI 0034	MO 0916	SM 0072
EC 0151	EI 0243	HI 0039	MO 0961	SM 0073
EC 0171	EI 0252	HI 0052	MP 0037	SM 0090
EC 0189	EI 0253	HI 0074	MP 0041	SM 0099
EC 0226	EI 0273	HI 0108	MP 0042	SM 0106
EC 0272	EI 0281	HI 0116	MP 0058	SM 0128
EC 0276	EI 0297	HI 0134	MP 0059	SM 0133
EC 0278	EI 0301	HI 0140	MP 0091	SM 0192
EC 0328	EI 0322	HI 0167	MP 0093	SM 0212
EC 0331	EI 0330	HI 0194	MP 0094	SM 0217
EC 0332	EI 0333	HI 0195	MP 0108	SM 0227
EC 0334	EI 0349	HI A0022	MP 0122	SM 0233
EC 0336	EI 0360	HI A0312	MP 0138	SM 0236
EC 0337	EI 0361	HI A0325	MP 0139	SM 0238
EC 0349	EI 0390	HI A0371	MP 0140	SM 0240
EC 0350	EW 0306	HI A0379	MP 0142	SM 0256
EC 0356	EW 0481	HI A0385	MP 0163	SM 0280
EC 0362	EW 0526	HI A0397	MP 0164	SM 0281
EI 0030	EW 0958	HI A0442	MP 0183	SM 0282
EI 0032	EW 0959	HI A0465	MP 0222	SS 0068
EI 0041	EW 0977	HI A0496	MP 0223	-continued

Table 5.—Blocks with DOCD's Approved in Calendar Year 1996 -continued

Area/ Block	Area/ Block	Area/ Block	Area/ Block
SS 0090	ST 0296	VR 0332	WC 0600
SS 0092	SX 0018	VR 0362	WC 0607
SS 0119	VK 0033	VR 0363	WC 0615
SS 0129	VK 0035	VR 0371	WC 0630
SS 0149	VK 0080	VR 0385	WC 0631
SS 0158	VK 0117	VR 0389	WC 0634
SS 0182	VK 0118	VR 0398	WC 0635
SS 0183	VK 0121	VR 0409	WD 0058
SS 0193	VK 0122	VR 0410	WD 0060
SS 0194	VK 0123	WC 0035	WD 0075
SS 0204	VK 0124	WC 0060	WD 0094
SS 0216	VK 0161	WC 0061	WD 0109
SS 0220	VK 0783	WC 0071	WD 0117
SS 0223	VK 0784	WC 0076	
SS 0232	VK 0817	WC 0077	
SS 0238	VK 0861	WC 0091	
SS 0239	VR 0026	WC 0098	
SS 0240	VR 0031	WC 0099	
SS 0242	VR 0037	WC 0102	
SS 0252	VR 0038	WC 0173	
SS 0258	VR 0039	WC 0180	
SS 0261	VR 0065	WC 0181	
SS 0266	VR 0066	WC 0196	
SS 0274	VR 0075	WC 0199	
SS 0301	VR 0078	WC 0205	
SS 0321	VR 0100	WC 0206	
SS 0349	VR 0119	WC 0225	
SS 0359	VR 0124	WC 0266	
ST 0037	VR 0156	WC 0269	
ST 0053	VR 0159	WC 0281	
ST 0063	VR 0203	WC 0294	
ST 0128	VR 0214	WC 0426	
ST 0135	VR 0215	WC 0427	
ST 0148	VR 0226	WC 0473	
ST 0162	VR 0250	WC 0491	
ST 0178	VR 0273	WC 0521	
ST 0179	VR 0274	WC 0522	
ST 0190	VR 0279	WC 0541	
ST 0221	VR 0281	WC 0551	
ST 0241	VR 0283	WC 0553	
ST 0259	VR 0289	WC 0556	
ST 0276	VR 0308	WC 0599	

Conclusions

The Gulf of Mexico OCS will increase its 1995 daily oil production from 945 MBOPD to a range between 1,660 MBOPD through 1,932 MBOPD by yearend 2000. The 1995 daily gas production rate of 13.09 Bcfpd will change to a range from 12.02 Bcfpd to 17.20 Bcfpd by yearend 2000. Future daily gas production rate estimates are less optimistic than future daily oil production rate estimates, primarily because the 40 identified deepwater fields in Table 1 are overall more oil prone. 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 year 2000, production from deepwater fields (> 1,000 feet) will account for 65 percent of the daily oil production and 28 percent of the daily gas production in the low case and 56 percent of the daily oil production and 19 percent 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:

T. Scott Williams
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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.