OCS Report
MMS 2009-012

Gulf of Mexico Oil and Gas Production Forecast: 2009-2018

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

Cover: The Independence Hub semisubmersible is the world's deepest production platform, located in 8,000 feet of water. It is designed to process up to one billion cubic feet of gas per day. Independence Hub began production in 2007. Photo courtesy of operator, Anadarko Petroleum Corporation. Other owners and subsea operators include: Devon Energy Corporation, ENI Petroleum Company, StatoilHydro USA E&P, Inc., Enterprise Products Partners L.P. and Helix Energy Solutions Group, Inc.

MMS Report
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Gulf of Mexico

Oil and Gas Production Forecast:

2009 – 2018

Asani Brewton
Richie Baud
Frank Yam
Lee Almasy
Thierry M. DeCort
Michelle Uli
Thomas Riches Jr.
Eric G. Kazanis
Angela G. Josey
Roy Bongiovanni

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Contents

Table of Abbreviations iv

Introduction 1

Forecast Method: Committed Scenario 2

Forecast Method: Full Potential Scenario 10

Factors Affecting the Forecast 12

Conclusions 14

Contributors 20

References 21

Notice 23

Figures

Water-depth and completion-depth divisions. 2

Gulf of Mexico Average Annual Oil Production. 17

Gulf of Mexico Average Annual Gas Production 19

Tables

Development Systems of Productive Deepwater GOM Projects 4

Gulf of Mexico Average Annual Oil Rates (Thousand Barrels/Day) 16

Gulf of Mexico Average Annual Gas Rates (Billion Cubic Feet/Day) 18

Table of Abbreviations

BCFPD	billion cubic feet per day
FPS	Floating Production System
GOM	Gulf of Mexico
MMBOE	million barrels of oil equivalent
MMBOPD	million barrels of oil per day
MMS	Minerals Management Service
OCS	Outer Continental Shelf
TVD	true vertical depth

Introduction

This report provides a daily oil and gas production rate forecast for the Gulf of Mexico (GOM) Outer Continental Shelf (OCS) for the years 2009 through 2018. The forecast shows average daily oil and gas production estimates for each calendar year. In this report, daily oil production rates include oil and condensate production, and daily gas production rates include gas-well gas and associated gas production.

This report refers to various deepwater development "projects." In most cases, the project names and their lateral extents are defined by operators. Hydrocarbon accumulations developed via a common surface facility or a common subsea system are typically considered to be a single project. Note that the water depth of a subsea project, or that of an undeveloped project, refers to the deepest water depth at a well location within that project.

The classifications used throughout this report are illustrated in Figure 1. Projects in less than 1,000 ft (305 m) water depths are considered to be shallow-water projects and those in greater than 1,000 ft (305 m) are considered to be deepwater projects. For gas production, the shallow water is further subdivided according to the true vertical depth (TVD) of the producing zones and the water depth. The "shallow-water deep" zone refers to gas production from well completions at or below 15,000 ft (4,572 m) TVD subsea and in water depths less than 656 ft (200 meters). All other shallow-water completions are referred to as part of the "shallow-water shallow" zone.

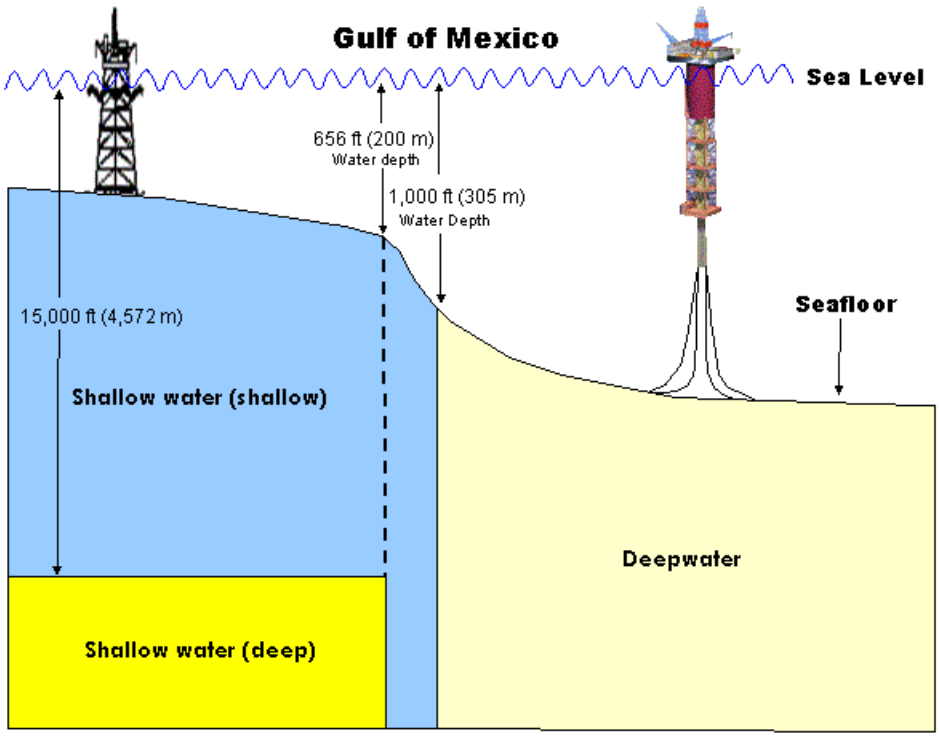


Figure 1. - Water-depth and completion-depth divisions.

Forecast Method: Committed Scenario

The committed scenario includes projects that are currently producing and those that operators have committed to producing in the near term. The 2008 production volumes have been estimated by using the data available at the time of this publication. The certainty of our forecast beyond 2008 is based, in part, on the accuracy of this 2008 estimate. Our committed scenario production estimates beyond 2008 are derived by forecasting GOM production in two major components. These components include the shallow-water trends and the deepwater projection (industry and MMS). Our method does not explicitly forecast production that may result from the passage of the Gulf of Mexico Energy Security Act of 2006, which among other things entails:

1.) a mandate calling for the Eastern Gulf Lease Sale 224 that includes a part of the Eastern Gulf of Mexico Planning Area more than 125 miles off the Florida coast and completely west of the Military Mission Line.

2.) the opening of 5.8 million acres of offshore Louisiana known as 181 South Area, part of the Central Planning Area, for lease for the first time since 1988.

MMS Shallow-water Projection and Shallow-water Deep Gas Projection

The forecast of shallow water oil and gas production was developed using historical production volumes dating back to 1983 for shallow water areas in the GOM. The 2004, 2005, 2006, and 2008 oil and gas volumes are anomalous (because of recovery from hurricane activity) and, therefore, not used to develop the forecast. The results of our analysis indicate a 13-percent effective annual decline for shallow-water oil and a 17.5-percent effective annual decline for shallow-water gas. The shallow-water deep gas production forecast incorporates a sustained production volume equal to the volume seen in 2007 for the first three years of the forecast period followed by a 9 percent effective annual decline for the remainder of the period to most closely simulate the historical production trends and to account for the high level of drilling recently observed on existing leases for deep gas. The method used to develop the shallow-water forecast and shallow-water deep gas forecast differs slightly from previous years in that we include only production from currently producing fields and existing discoveries. Production from future discoveries on existing leases and from leases not yet awarded are now accounted for in the undiscovered resources portion of the report.

Deepwater Projection - Industry and MMS

Deepwater GOM operators were surveyed in order to project near-term deepwater activity. This method of surveying operators to forecast production was analyzed in our 2004 report (Melancon et al., 2004) and confirmed the ability of operators to project future deepwater production accurately. Operators were asked to provide projected production rates for all deepwater projects online or planned to come online before yearend 2014. The names and startup years of the publicly releasable projects are shown in Table 1. The deepwater oil and gas production estimates (based on the operator survey) are assumed to have an effective annual decline rate of 12 percent each year (an assumption based on historic deepwater decline rates) from 2014 through 2018.

Table 1 - Development Systems of Productive Deepwater GOM Projects					
Year of First Production	**Project Name[2]**	**Operator**	**Block**	**Water Depth (ft)**	**System Type**
1979	Cognac	Shell	MC 194	1,023	Fixed Platform
1984	Lena	ExxonMobil	MC 280	1,000	Compliant Tower
1988	GC 29[1]	Placid	GC 29	1,540	Semisubmersible/Subsea
1988	GC 31[1]	Placid	GC 31	2,243	Subsea
1989	Bullwinkle	Shell	GC 65	1,353	Fixed Platform
1989	Jolliet	ConocoPhillips	GC 184	1,760	TLP
1991	Amberjack	BP	MC 109	1,100	Fixed Platform
1992	Alabaster	ExxonMobil	MC 485	1,438	Subsea
1993	Diamond[1]	Kerr McGee	MC 445	2,095	Subsea
1993	Zinc	ExxonMobil	MC 354	1,478	Subsea
1994	Auger	Shell	GB 426	2,860	TLP
1994	Tahoe/SE Tahoe	Shell	VK 783	1,500	Subsea
1994	Pompano/ Pompano II	BP	VK 989	1,290	Fixed Platform/ Subsea
1995	Cooper[1]	Newfield	GB 388	2,097	Semisubmersible
1995	Shasta[1]	ChevronTexaco	GC 136	1,048	Subsea
1995	VK 862	Walter	VK 862	1,043	Subsea
1996	Rocky[1]	Shell	GC 110	1,785	Subsea
1996	Popeye	Shell	GC 116	2,000	Subsea
1996	Mars	Shell	MC 807	2,933	TLP/Subsea
1997	Troika	BP	GC 200	2,721	Subsea
1997	Mensa	Shell	MC 731	5,318	Subsea
1997	Neptune	Kerr McGee	VK 826	1,930	Spar/Subsea
1997	Ram-Powell	Shell	VK 956	3,216	TLP
1998	Oyster	Marathon	EW 917	1,195	Subsea
1998	Morpeth	Eni	EW 921	1,700	TLP/Subsea
1998	Arnold	Marathon	EW 963	1,800	Subsea
1998	Baldpate	Amerada Hess	GB 260	1,648	Compliant Tower
1999	EW 1006	Walter	EW 1006	1,884	Subsea
1999	Penn State	Amerada Hess	GB 216	1,450	Subsea
1999	Dulcimer[1]	Mariner	GB 367	1,120	Subsea
1999	Macaroni	Shell	GB 602	3,600	Subsea
1999	Angus	Shell	GC 113	2,045	Subsea
1999	Genesis	ChevronTexaco	GC 205	2,590	Spar
1999	Allegheny	Eni	GC 254	3,294	TLP
1999	Gemini	ChevronTexaco	MC 292	3,393	Subsea
1999	Pluto	Mariner	MC 674	2,828	Subsea
1999	Ursa	Shell	MC 809	3,800	TLP
1999	Virgo	TotalFinaElf	VK 823	1,130	Fixed Platform
2000	Allegheny South	ENI	GC 298	3,307	Subsea
2000	Hoover	ExxonMobil	AC 25	4,825	Spar

Table 1 - Development Systems of Productive Deepwater GOM Projects - *continued*					
Year of First Production	**Project Name[2]**	**Operator**	**Block**	**Water Depth (ft)**	**System Type**
2000	Diana	ExxonMobil	EB 945	4,500	Subsea
2000	Black Widow	Mariner	EW 966	1,850	Subsea
2000	Northwestern	Amerada Hess	GB 200	1,736	Subsea
2000	Conger	Amerada Hess	GB 215	1,500	Subsea
2000	King	Shell	MC 764	3,250	Subsea
2000	Europa	Shell	MC 935	3,870	Subsea
2000	Petronius	ChevronTexaco	VK 786	1,753	Compliant Tower
2000	Marlin	BP	VK 915	3,236	TLP
2001	Pilsner	Unocal	EB 205	1,108	Subsea
2001	Marshall	ExxonMobil	EB 949	4,376	Subsea
2001	Prince	El Paso	EW 1003	1,500	TLP
2001	EW 878	Walter	EW 878	1,585	Subsea
2001	Ladybug	ATP	GB 409	1,355	Subsea
2001	Serrano	Shell	GB 516	3,153	Subsea
2001	Oregano	Shell	GB 559	3,400	Subsea
2001	Brutus	Shell	GC 158	3,300	TLP
2001	Typhoon[7]	Helix	GC 237	2,679	TLP
2001	Mica	ExxonMobil	MC 211	4,580	Subsea
2001	MC 68[1]	Walter	MC 68	1,360	Subsea
2001	Crosby	Shell	MC 899	4,400	Subsea
2001	Einset[1]	Shell	VK 872	3,500	Subsea
2001	Nile	BP	VK 914	3,535	Subsea
2002	Madison	ExxonMobil	AC 24	4,856	Subsea
2002	King's Peak	BP	DC 133	6,845	Subsea
2002	Lost Ark	Nobel	EB 421	2,960	Subsea
2002	Nansen	Kerr McGee	EB 602	3,685	Spar
2002	North Boomvang[4]	Kerr McGee	EB 643	3,650	Spar
2002	Navajo	Kerr McGee	EB 690	4,210	Subsea
2002	Tulane	Amerada Hess	GB 158	1,054	Subsea
2002	Manatee	Shell	GC 155	1,939	Subsea
2002	Sangria[1]	Hydro GOM	GC 177	1,487	Subsea
2002	Aspen	BP	GC 243	3,065	Subsea
2002	King Kong	Mariner	GC 472	3,980	Subsea
2002	Yosemite	Mariner	GC 516	4,150	Subsea
2002	Horn Mountain	BP	MC 127	5,400	Spar
2002	Aconcagua	TotalFinaElf	MC 305	7,100	Subsea
2002	Camden Hills	Marathon	MC 348	7,216	Subsea
2002	Princess	Shell	MC 765	3,642	Subsea
2002	King[9]	BP	MC 84	5,418	Subsea
2002	East Boomvang[4]	Kerr McGee	EB 688	3,795	Subsea
2003	Falcon	Marubeni	EB 579	3,638	Subsea

Table 1 - Development Systems of Productive Deepwater GOM Projects - *continued*					
Year of First Production	**Project Name[2]**	**Operator**	**Block**	**Water Depth (ft)**	**System Type**
2003	Tomahawk	Marubeni	EB 623	3,412	Subsea
2003	West Boomvang[4]	Kerr McGee	EB 642	3,678	Subsea
2003	Habanero	Shell	GB 341	2,015	Subsea
2003	Durango[5]	Kerr McGee	GB 667	3,105	Subsea
2003	Gunnison	Kerr McGee	GB 668	3,100	Spar
2003	Dawson[5]	Kerr McGee	GB 669	3,152	Subsea
2003	Boris	BHP Billiton	GC 282	2,378	Subsea
2003	Matterhorn	TotalFinaElf	MC 243	2,850	TLP
2003	Pardner	Anadarko	MC 401	1,139	Subsea
2003	Zia	Devon	MC 496	1,804	Subsea
2003	Herschel/ Na Kika	Shell	MC 520	6,739	Semisubmersible/Subsea[3]
2003	Fourier/ Na Kika	Shell	MC 522	6,940	Semisubmersible/Subsea[3]
2003	North Medusa	Murphy	MC 538	2,223	Subsea
2003	Medusa	Murphy	MC 582	2,223	Spar
2003	East Ansley/Na Kika	Shell	MC 607	6,590	Semisubmersible/Subsea[3]
2004	Devil's Tower	Eni	MC 773	5,610	Spar
2004	South Diana	ExxonMobil	AC 65	4,852	Subsea
2004	Hack Wilson	Kerr-McGee	EB 599	3,650	Subsea
2004	Raptor	Pioneer	EB 668	3,710	Subsea
2004	Harrier[1]	Pioneer	EB 759	4,114	Subsea
2004	Llano	Shell	GB 386	2,340	Subsea
2004	Magnolia	Conocophilips	GB 783	4,674	TLP
2004	Red Hawk	Kerr-McGee	GB 877	5,300	Spar
2004	GB 208	McMoran	GB 208	1,275	Subsea
2004	Glider	Shell	GC 248	3,440	Subsea
2004	Front Runner	Murphy	GC 338	3,330	Spar
2004	Marco Polo	Anadarko	GC 608	4,300	TLP
2004	Holstein	BP	GC 645	4,340	Spar
2004	Kepler/Na Kika	BP	MC 383	5,759	Semisubmersible/Subsea[3]
2004	Ariel/Na Kika	BP	MC 429	6,240	Semisubmersible/Subsea[3]
2004	Coulomb/ Na Kika	Shell	MC 657	7,591	Semisubmersible/Subsea[3]
2004	Ochre	Mariner	MC 66	1,144	Subsea
2004	MC 837	Walter	MC 837	1,524	Subsea
2005	GC 137	Nexen	GC 137	1,168	Subsea
2005	Citrine	LLOG	GC 157	2,614	Subsea
2005	Baccarat	W and T Offshore	GC 178	1,404	Subsea
2005	K2	Anadarko	GC 562	4,006	Subsea
2005	Mad Dog	BP	GC 782	4,420	Spar
2005	Triton/Goldfinger	Eni	MC 728	5,610	Subsea
2005	Killer Bee	Walter	MC 582		Subsea
2005	Swordfish	Noble	VK 962	4,677	Subsea

Table 1 - Development Systems of Productive Deepwater GOM Projects - *continued*					
Year of First Production	**Project Name[2]**	**Operator**	**Block**	**Water Depth (ft)**	**System Type**
2006	SW Horseshoe	Walter	EB 430	2,285	Subsea
2006	Dawson Deep	Kerr McGee	GB 625	2,965	Subsea
2006	Lorien	Noble	GC 199	2,315	Subsea
2006	K2 North	Anadarko	GC 518	4,049	Subsea
2006	Constitution	Kerr McGee	GC 680	4,970	Spar
2006	Ticonderoga	Kerr McGee	GC 768	5,272	Subsea
2006	Rigel	Eni	MC 252	5,225	Subsea
2006	Gomez	ATP	MC 711	2,975	Semisubmersible
2006	Seventeen Hands	Eni	MC299	5,881	Subsea
2007	Vortex/Ind. Hub	Anadarko	AT 261	8,344	FPS/Subsea[6]
2007	Jubilee/Ind. Hub	Anadarko	AT 349	8,825	FPS/Subsea[6]
2007	Merganser/Ind. Hub	Anadarko	AT 37	8,015	FPS/Subsea[6]
2007	San Jacinto/Ind. Hub	Eni	DC 618	7,850	FPS/Subsea[6]
2007	Spiderman/Ind. Hub	Anadarko	DC 621	8,087	FPS/Subsea[6]
2007	Cottonwood	Petrobras	GB 244	2,130	Subsea
2007	Shenzi[8]	BHP Billiton	GC 652	4,300	Subsea
2007	Atlantis	BP	GC 787	7,050	Semisubmersible
2007	Mondo NW/Ind. Hub	Anadarko	LL 1	8,340	FPS/Subsea[6]
2007	Cheyenne/Ind. Hub	Anadarko	LL 399	8,951	FPS/Subsea[6]
2007	Atlas-Atlas NW/Ind. Hub	Anadarko	LL 50	8,934	FPS/Subsea[6]
2007	Wrigley	Newfield	MC 506	3,911	Subsea
2007	Deimos	Shell	MC 806	3,106	Subsea
2007	Q/Ind. Hub	Hydro	MC 961	7,925	FPS/Subsea[6]
2007	Anduin	ATP	MC 755	2,904	Subsea
2007	Tiger	Deep Gulf Energy	GC 195	1,900	Subsea
2008	Neptune	BHP Billiton	AT 575	4,232	TLP
2008	MC 161	Walter	MC 161	2,924	Subsea
2008	Raton	Nobel	MC 248	3,290	Subsea
2008	Blind Faith	ChevronTexaco	MC 696	6,989	Semisubmersible
2008	Valley Forge	LLOG	MC 707	1,538	Subsea
2008	Thunder Horse	BP	MC 778	6,037	Semisubmersible
2008	Bass Lite	Mariner	AT 426	6,634	Subsea
2009	Pegasus	Eni	GC 385	3,498	Subsea
2009	Mirage and Morgus	ATP	MC 941	4,000	Mini TLP
2009	Dorado	BP	VK 915	3,236	Subsea
2009	Unreleasable[10]				
2009	GB 302	Walter	GB 302	2,410	Subsea
2009	Tahiti	ChevronTexaco	GC 640	4,000	Spar
2009	Longhorn	Eni	MC 502	2,442	Subsea
2009	Isabela	BP	MC 562	6,500	Subsea

Table 1 - Development Systems of Productive Deepwater GOM Projects - *continued*					
Year of First Production	**Project Name[2]**	**Operator**	**Block**	**Water Depth (ft)**	**System Type**
2009	Thunder Hawk	Murphy	MC 734	6,050	Semisubmersible
2009	Clipper	ATP	GC 299	3,452	
2009	MC 72	LLOG	MC 72	2,013	
2009	MC 583	Walter	MC 583	2,487	
2009	Thunder Horse North	BP	MC 776	5,660	
2009	Geauxpher	Mariner	GB 462	2,823	
2009	Unreleasable[10]				
2009	Unreleasable[10]				
2009	Unreleasable[10]				
2010	Telemark	ATP	AT 63	4,385	Mini TLP
2010	Great White	Shell	AC 857	8,000	Spar
2010	MC 241	Walter	MC 241	2,415	
2010	Caesar Tonga	Anadarko	GC 683	4,672	Subsea
2010	Silvertip	Shell	AC 815	9,226	Subsea
2010	Tobago	Shell	AC 859	9,627	Subsea
2010	Cascade	Petrobras	WR 206	8,143	FPSO/Subsea
2010	Chinook	Petrobras	WR 469	8,831	FPSO/Subsea
2010	Droshky	Marathon	GC 244	2,900	
2010	Unreleasable[10]				
2010	Unreleasable[10]				
2011	Ozona	Marathon	GB 515	3,000	
2012	Unreleasable[10]				
2012	Unreleasable[10]				
2013	Unreleasable[10]				
2013	Unreleasable[10]				
2013	Unreleasable[10]				
2013	Unreleasable[10]				
2013	Unreleasable[10]				
2013	Unreleasable[10]				
2013	Unreleasable[10]				
2013	Unreleasable[10]				
2013	Puma	BP	GC 823	4,129	
2014	Unreleasable[10]				
2016	Unreleasable[10]				

[1] Indicates projects that are no longer on production.

[2] The previous edition of this report listed deepwater fields, whereas this version lists deepwater projects.

[3] Na Kika FPS is located in Mississippi Canyon Block 474 in 6,340 ft (1,932 m) of water.

[4] 2004 Report referred to entire area as Boomvang

[5] Included in 2004 Report with Gunnison

[6] Independence Hub FPS will be located in Mississippi Canyon Block 920 in 7,920 ft (2,414 m) of water.

[7] Formerly known as Typhoon under ChevronTexaco operation, now named Phoenix under Helix operation.

[8] Formerly known as Genghis Khan/Ind. Hub

[9] Includes King South

[10] Unreleasable – operator has commitment to produce and/or is planning develope project but has not publicly released project information.

AC = Alaminos Canyon

AT = Atwater Valley

DC = De Soto Canyon

EB = East Breaks

EW = Ewing Bank

GB = Garden Banks

GC = Green Canyon

LL = Lloyd Ridge

MC = Mississippi Canyon

VK = Viosca Knoll

WR = Walker Ridge

Forecast Method: Full Potential Scenario

The Full Potential Scenario adds potential oil and gas production from industry-announced deepwater discoveries and undiscovered resources in all water depths. This part of the production forecast is more speculative than the committed scenario.

Industry-Announced Discoveries

Gulf of Mexico operators have announced numerous deepwater discoveries that were not reported in the operator survey, possibly because these projects have not been fully assessed and operators have not yet committed to development schedules. Many of these industry-announced discoveries are likely to begin production within the next 10 years. Some may even begin production within the next 5 years.

The industry-announced component is based on the following assumptions:

1.) Ultimate recoverable volumes from the industry-announced discoveries are taken from independent, proprietary MMS assessments whenever available; otherwise, the industry-announced volumes are used.

2.) During the first year of production, each project is assumed to produce at half its peak rate.

3.) Projects with discovered resource volumes over 200 MMBOE are assumed to reach peak production in their second year, sustain that peak rate for a total of 4 years, then decline at an effective annual 12 percent rate from that time forward.

4.) The estimated peak production rate for each project is based on the estimated recoverable reserves as follows:

Peak Rate = (0.00027455)*(ult rec rsvs) + 9000

where the peak rate is in barrels of oil equivalent (BOE) per day and the ultimate recoverable reserves (ult rec rsvs) are in BOE. This relationship was

derived by plotting maximum production rates of known fields against the ultimate recoverable reserves of those fields and performing a linear regression. Note that MMS reserve estimates are on a field basis, so we assume here that this relationship based on historic field trends can be applied on a project basis.

5.) Projects announced as gas discoveries are assumed to be 100-percent gas. Projects in the subsalt Miocene and Lower Tertiary plays are assumed to be 84-percent oil and 16-percent gas based on the average production capacities of facilities slated to accommodate these projects. It should be noted that percentage of oil for some of these plays reaches into the high 90-percent range. The reserves of all other projects are assumed to be 61-percent oil and 39-percent gas, on the basis of an average of historic deepwater production.

6.) The year when each industry-announced discovery is expected to begin production is estimated by using available information.

7.) All industry-announced discoveries with resource estimates greater than 20 MMBOE are assumed to begin production within the next 10 years.

Undiscovered Resources

This section of the forecast represents oil and gas production volumes that exist in yet-to-be discovered fields that are anticipated to commence production during the forecast period. These resources exist primarily on GOM acreage that is expected to be leased in future Outer Continental Shelf (OCS) lease sales. The production volumes forecast from these yet-to-be discovered fields is derived from: GOM tracts scheduled to be leased during the remaining lease sales in the 2007-2012 Five-Year Oil and Gas Leasing Program, future GOM lease sales that are projected to be held between 2012-2018, and future discoveries that will be made on existing leases. The production volumes forecast from the undiscovered fields do not include areas in the GOM currently under moratoria.

The forecast methodology assumes that the volumes of oil and gas produced from acreage leased during the forecast period will be within the range of historically

discovered reserve volumes for each sale and will exhibit similar production profiles. Previously discovered volumes and production profiles from each individual lease sale held between 1983 and 2008 are used to develop production profiles for both oil and gas that are representative of a characteristic sale for each Planning Area. These profiles are developed by aggregating lease-sale specific historical production volumes on an annual basis, setting each sale date to time-zero, and calculating an average production volume for each time period. An average annual GOM production profile is then calculated using the oil and gas production profiles for each Planning Area. The 10-year forecast of undiscovered production is developed using the annual GOM production profile in a time series and shifting each profile one year forward from the previous profile such that time-zero for each of the ten profiles corresponds to each year of the forecast period. The production volumes are then aggregated on an annual basis to determine the total volume by forecast year.

The model used is constrained by:

1.) Observed range of historical production volumes resulting from acreage leased in all previously held GOM Lease Sales.

2.) Reported volumes of oil and gas that are anticipated to be leased, developed, and produced as a result of a single sale in each Planning Area.

The reported volumes are those published in the "Proposed Final Program Outer Continental Shelf Oil and Gas Leasing Program 2007 - 2012" which are based, in part, on data from MMS' 2006 "Assessment of Undiscovered Technically Recoverable Oil and Gas Resources of the Nation's Outer Continental Shelf."

Factors Affecting the Forecast

The Gulf of Mexico Oil and Gas Production Forecast provides the public with our view of what the production from the Gulf of Mexico will be over the next ten years. However, at any time there are a number of factors which may alter the forecast or contribute to whether the projects listed in Table 1 are able to begin production on schedule.

Technology Challenges

Much of the new development within the Gulf of Mexico is in water depths greater than 1000 ft and often targeting prospects beneath salt. There are a limited number of rigs capable of drilling at these depths and under these conditions. Demand for rig time has outstripped the supply, causing delays. Fluctuation in oil prices, equipment failures, rises in the costs of equipment and materials, as well as a shortage of skilled labor are also common obstacles to current and future oil and gas production within the Gulf of Mexico. Additionally, drilling conditions vary greatly over the Gulf. For example, projects grappling with drilling in high-pressure zones face different technological challenges than projects drilling in ultra-deepwater. Addressing these challenges requires that companies stay on the cutting edge of drilling and production technology, increasing the risk involved in these ventures.

Hurricanes

An uncontrollable factor in the forecast is hurricanes. Hurricanes cause short-term delays by forcing the removal of personnel from offshore sites before and during the storms, leaving most production facilities shut-in during these times. Hurricanes may lead to damage at production facilities or to the thousands of miles of pipeline used to transport the hydrocarbons to land. Repairs for this type of damage take time and may lead to delays regarding upcoming projects or result in temporarily lowered production volumes for currently producing projects. While hurricanes are not an uncommon occurrence in the Gulf of Mexico the majority of them do not impact long-term production significantly. This is because most hurricanes cause relatively minor damage to infrastructure and production can be restored quickly. It is only those hurricanes that cause severe infrastructure damage within the Gulf, such as Ivan in 2004, Katrina and Rita in 2005, and Gustav and Ike in 2008, that cause anomalous decreases in the overall yearly production rates. These decreases do not reflect the overall trends seen within the Gulf of Mexico oil and gas production and thus data from these years is not used in the projections.

Conclusions

Historic oil production in the Gulf of Mexico (GOM) increased steadily from 1993 through 2002, leveled off in 2003, and declined in 2004 and 2005. The sharp decline seen was caused in large part by Hurricane Ivan in 2004 and hurricanes Katrina and Rita in 2005. During 2006 and 2007 oil production remained steady, but had not reached pre-hurricane Katrina production volumes. The 2008 oil production volumes again show a sharp decline, due in large part to damage from hurricanes Gustav and Ike. Shallow-water oil production declined steadily since 1997, but was offset by increasing deepwater oil production during most of that period. Historic gas production in the GOM followed similar trends. While shallow-water deep-gas production generally increased during the period 1993 through 2002, the shallow-water gas production dropped steadily from 1996 though 2008. Although deepwater gas production increased during much of that period, it was not sufficient to prevent an overall decline in total GOM gas production through 2008.

The anticipated increase in production for the year 2009 reflects not only production from the many projects slated to come online in this year, but also the addition of volumes that were shut-in during 2008 as a result of hurricane activity. For the oil, 75-percent of the increase in production is a reflection of shut-in volumes coming back online in early 2009. Seventy-two-percent of the increase of gas production results from shut-in volumes coming back online.

Within the next 10 years, total GOM oil production is expected to exceed 1.6 million barrels of oil per day (MMBOPD) based on existing shallow and deepwater operator commitments as shown in Table 2 and Figure 2. If industry-announced discoveries and undiscovered resources realize their full potential, production could reach 1.9 MMBOPD. Once a peak is reached, oil production may level off or begin to show a slight decline depending on whether industry-announced discoveries and undiscovered resources are maximized.

Based on existing shallow and deepwater operator commitments, GOM gas production is expected to reach about 7 billion cubic ft per day (BCFPD) as shown in Table 3 and

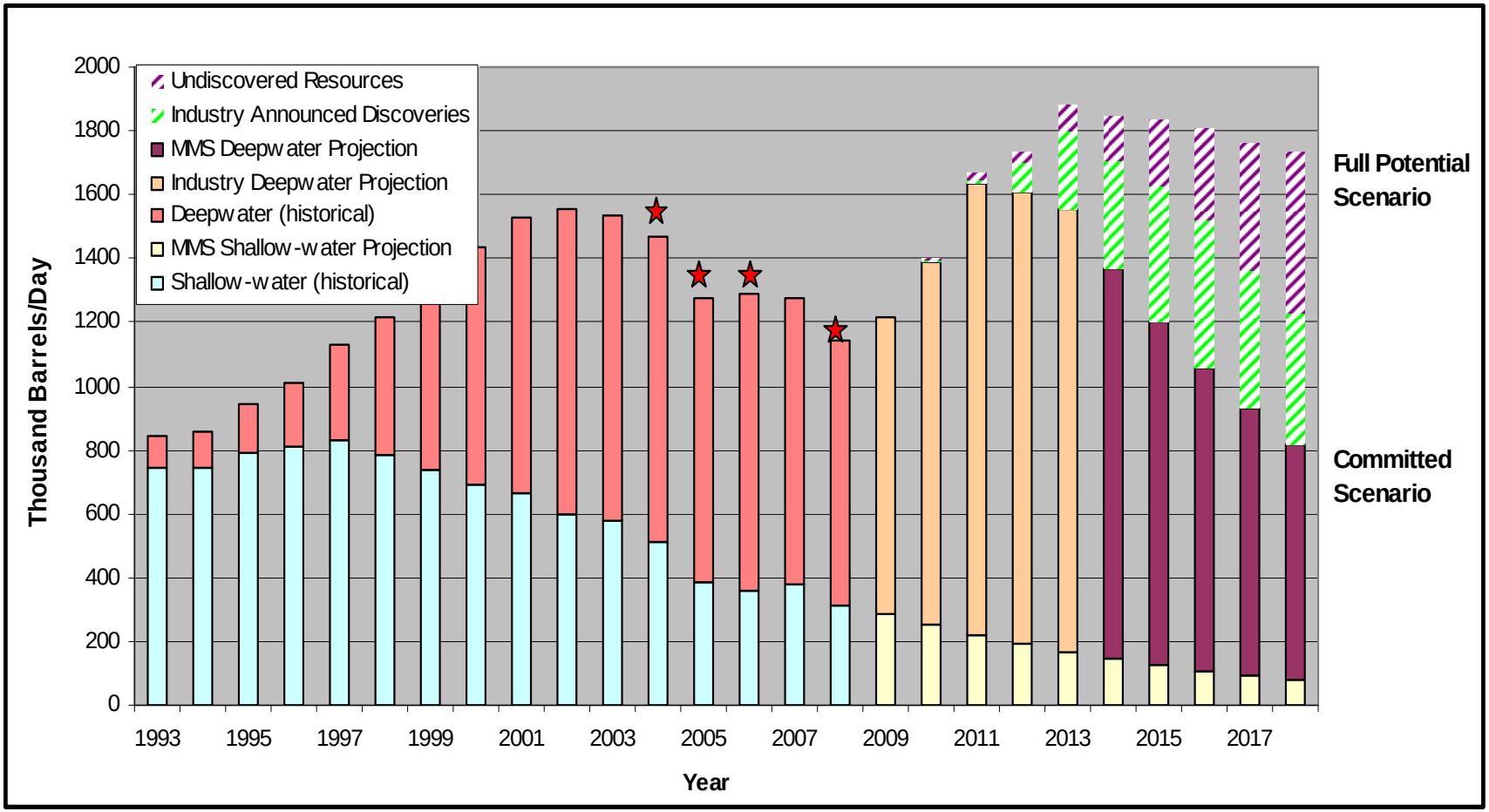
Figure 3. In the committed scenario, a decline in production is seen beyond 2009. However, if contributions from industry-announced discoveries and undiscovered resources reach their full potential, the GOM gas production decline could level off or show a small reversal within the forecast period. Realization of this full potential scenario will depend on operator commitments to develop these resources within the next 10 years. The small contribution to gas production from industry-announced discoveries reflects the overall trend of lower gas-oil-ratios anticipated in the subsalt Miocene and Lower Tertiary plays, found in deepwater Gulf of Mexico.

Each component described in this report adds potential GOM production to the forecast and the uncertainty increases with each subsequent component. The data from each component used in this report are presented in Tables 2 and 3 so that the reader may decide the degree of certainty that he or she deems appropriate. Whatever degree of certainty used, one can conclude that GOM oil production is expected to increase within the forecast period and GOM gas production is expected to remain below rates seen in the 1990's.

Table 2. - Gulf of Mexico Average Annual Oil Rates (Thousand Barrels/Day)

Year	Shallow-water	MMS Shallow-water Projection	Deepwater	Industry Deepwater Projection	MMS Deepwater Projection	Committed Scenario-Total GOM	Industry-Announced Discoveries	Undiscovered Resources	Full Potential Scenario-Total GOM
1993	745		101			845			
1994	746		115			860			
1995	792		151			943			
1996	813		198			1010			
1997	830		296			1126			
1998	781		436			1217			
1999	738		615			1353			
2000	690		743			1433			
2001	667		864			1531			
2002	601		955			1556			
2003	577		957			1534			
2004^	513		953			1466			
2005^	387		892			1279			
2006^	357		929			1286			
2007	381		895			1276			
2008^	313*		829*			1142*			
2009		288		925		1213	0	2	1215
2010		251		1140		1391	7	7	1405
2011		218		1417		1635	13	18	1667
2012		190		1418		1608	94	33	1735
2013		165		1393		1558	241	80	1879
2014		144			1226	1369	341	138	1849
2015		125			1079	1204	425	205	1833
2016		109			949	1058	463	288	1809
2017		95			835	930	431	399	1760
2018		82			735	817	410	508	1735

^Indicates years with known anomalous data due to hurricane affected shut-in
*Estimate



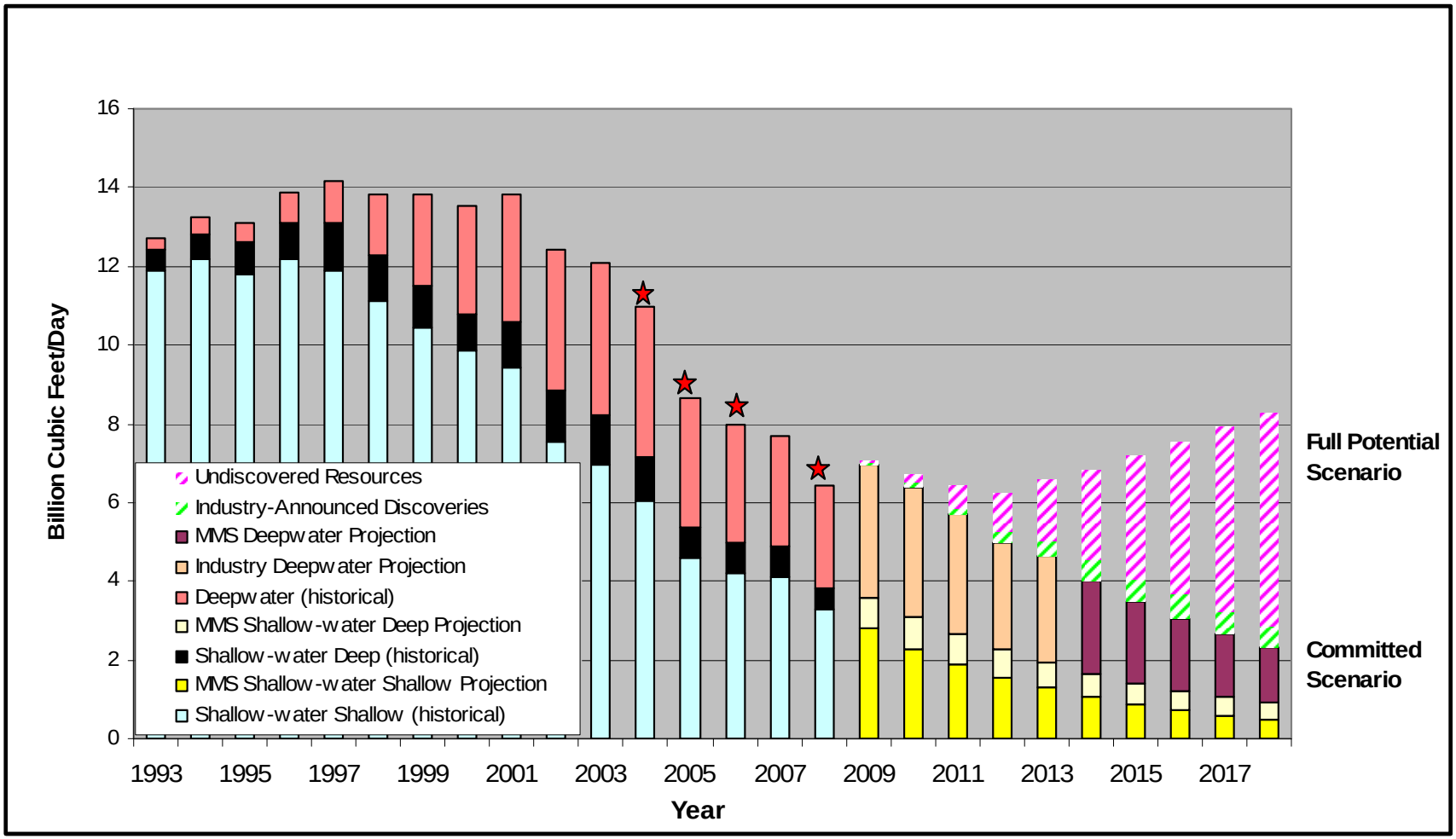
★ Indicates years with known anomalous data due to hurricane affected shut-in

Figure 2. - Gulf of Mexico Average Annual Oil Production.

Table 3. - Gulf of Mexico Average Annual Gas Rates (Billion Cubic Feet/Day)

Year	Shallow-water Shallow	MMS Shallow-water Shallow Projection	Shallow-water Deep	MMS Shallow-water Deep Projection	Deepwater	Industry Deepwater Projection	MMS Deepwater Projection	Committed Scenario-Total GOM	Industry-Announced Discoveries	Undiscovered Resources	Full Potential Scenario-Total GOM
1993	11.89		0.51		0.33			12.73			
1994	12.20		0.60		0.44			13.24			
1995	11.79		0.81		0.49			13.09			
1996	12.17		0.93		0.76			13.86			
1997	11.87		1.23		1.05			14.15			
1998	11.11		1.19		1.54			13.84			
1999	10.44		1.06		2.31			13.81			
2000	9.84		0.96		2.74			13.54			
2001	9.42		1.18		3.23			13.83			
2002	7.56		1.31		3.53			12.40			
2003	6.97		1.23		3.89			12.09			
2004^	6.04		1.10		3.83			10.97			
2005^	4.58		0.80		3.26			8.64			
2006^	4.19		0.81		2.98			7.98			
2007	4.09		0.79		2.79			7.67			
2008^	3.29*		0.55*		2.59*			6.43*			
2009		2.78		0.79		3.4		6.97	0.03	0.03	7.03
2010		2.29		0.79		3.3		6.38	0.12	0.23	6.73
2011		1.89		0.79		3.01		5.69	0.17	0.55	6.41
2012		1.56		0.72		2.72		5.00	0.26	0.96	6.22
2013		1.29		0.65		2.68		4.62	0.42	1.53	6.57
2014		1.06		0.60			2.36	4.02	0.51	2.29	6.82
2015		0.88		0.54			2.08	3.49	0.58	3.12	7.20
2016		0.72		0.49			1.83	3.04	0.61	3.9	7.55
2017		0.60		0.45			1.61	2.65	0.56	4.71	7.93
2018		0.49		0.41			1.41	2.32	0.53	5.42	8.27

^Indicates years with known anomalous data due to hurricane affected shut-in
*Estimate



★ Indicates years with known anomalous data due to hurricane affected shut-in

Figure 3. – Gulf of Mexico Average Annual Gas Production.

Contributors

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Notice

Our goal is to publish a reliable production forecast based on the data available. Therefore, we periodically review our methodology to improve our process and provide accurate information. 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.

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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.

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