Gulf of Mexico Natural Gas Resources and Pipeline Infrastructure

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GULF OF MEXICO

NATURAL GAS RESOURCES AND PIPELINE INFRASTRUCTURE

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GULF OF MEXICO
NATURAL GAS RESOURCES AND PIPELINE INFRASTRUCTURE

I. EXECUTIVE SUMMARY

Introduction

The Gulf of Mexico offshore area is one of the most important natural gas supply areas in the United States. This report was prepared by Foster Associates, Inc., on behalf of the INGAA Foundation, to promote greater understanding of the role this dynamic producing area plays in the U.S. energy profile. The report discusses important offshore producing regions, producers and relevant new development areas, as well as the infrastructure of gas pipelines necessary to transport these supplies to U.S. markets. Pipeline characteristics covered include identification of pipelines and their ownership, location and facility configurations, diameter and new pipeline proposals.

Offshore Gas Supply Regions

The Gulf of Mexico offshore natural gas producing area provides U.S. markets with 26 percent of indigenous gas supplies and contains 18 percent of proven reserves. In addition, potential recoverable reserves total 48 Tcf, representing 21 percent of the total Lower 48 States' potential gas reserves.

The Gulf can be divided into different producing regions, such as federal and state waters. The federal waters contain the majority of the offshore producing reserves (95 percent), with the remaining reserves split between Louisiana state waters (3 percent) and Texas state waters (2 percent). For the purpose of this analysis, Foster Associates has further divided the Gulf of Mexico federal waters into five regions: Eastern Louisiana, Central Louisiana, Western Louisiana, Texas and the Eastern Gulf.

In terms of production, discovered reserves, and leased acreage, the Central and Western Louisiana regions are the largest of the Gulf's regions. The following table presents gas supply data for each of the five regions.

GAS SUPPLY DATA BY REGION
1994

Region	Pro-duction (%)	Proven Remaining Reserves (%)	No. of Leases		
			Producing	Non-producing	Total
Eastern Louisiana	9.3%	13.5%	378	787	1,165
Central Louisiana	38.8	36.9	666	783	1,449
Western Louisiana	34.9	29.5	597	881	1,478
Texas	15.5	14.9	226	478	704
Eastern Gulf	1.5	5.2	52	118	170
TOTAL	100.0	100.0	1,919	3,047	4,966

Source: MMS, 1994 Update and Federal Offshore Statistics: 1993 and Foster Associates, Inc.

Since the mid-1950s, the Minerals Management Service of the U.S. Department of the Interior has leased 26 million acres, representing 4,966 leases in the Gulf. About 61 percent of these leases are not currently producing, providing abundant potential for further development opportunities. The regions with the highest proportion of non-producing acreage are the Eastern Gulf, Texas and Eastern Louisiana.

Three major interest areas in the Gulf of Mexico are deepwater drilling, Eastern Gulf reserves and subsalt drilling. One of the first deepwater projects commenced production in 1994 when Shell installed its tension leg platform in the Auger project (Garden Banks Block 426) at a water depth of 953 meters. Several other deepwater projects are currently underway in the Mississippi Canyon, Viosca Knoll and Green Canyon areas. Eastern Gulf discoveries have been particularly significant in the Mobile Bay area. One promising area is the Norphlet trend, with 7 to 8 Tcf of potentially recoverable reserves. Finally, the subsalt trend offers substantial promise in light of

recent drilling successes, particularly the Mahogany project in the Ship Shoal area being developed by Phillips, Anadarko and Amoco.

While the Gulf of Mexico production and lease holdings are not overly concentrated within a few large companies, market shares for the 10 largest producers in the Gulf do exceed the U.S. average. The 10 largest lease owners hold approximately 53 percent of the federal acreage and the 10 largest companies produce 52 percent of the total offshore production. For the total U.S. (onshore and offshore), the market share for the 10 largest gas producers is about 31 percent.

Offshore Pipelines

About 130 companies operate pipelines in Gulf of Mexico state and federal waters. Active offshore gas pipelines total 14,773 miles, with approximately 91 percent located in federal waters and 9 percent in state waters. Over 20 percent of the active pipeline mileage has been constructed within the past five years. Gas producers (majors and independents) have constructed three-quarters of these lines. An additional 775 miles of pipe are currently planned for the Gulf of Mexico, and producers are also responsible for the majority of this proposed mileage.

Owners of existing offshore pipelines are primarily a mix of interstate transmission companies and gas producers. The 10 largest companies own 53 percent of the total offshore mileage. Eight are interstate pipelines and two are producers. Of the next 10 large owners, four are interstate pipelines and six are producers. The concentration of pipeline ownership (e.g., the top 10 companies hold 53 percent) is consistent with the concentration of production, where the top 10 lease owners hold 53 percent of the federal offshore leases and the 10 largest producers represent 52 percent of the production.

The distribution of offshore pipeline mileage by ownership type, region and size is shown on the following table.

SUMMARY OF PIPELINE OWNERSHIP/OPERATION
BY LOCATION AND DIAMETER
(Percentage Distribution)

	Interstate Pipelines	Major Producers	Indepen-dents	Pipeline Affiliates	TOTAL
A. Pipeline Location (by origin)					
Eastern Louisiana	32%	31%	32%	5%	100%
Central Louisiana	54	23	22	1	100
Western Louisiana	60	12	22	6	100
Texas	39	7	46	8	100
Eastern Gulf	10	46	21	23	100
State Waters	44	18	35	3	100
TOTAL OWNERSHIP	50	19	27	4	100
B. Pipeline Diameter					
<9 inches	16%	30%	50%	4%	100%
9-18 inches	63	14	18	5	100
19-27 inches	79	8	9	4	100
>27 inches	99	1	-	-	100
TOTAL OWNERSHIP	50	19	27	4	100

Interstate pipelines own about half of the offshore mileage, primarily in Central and Western Louisiana. Across the entire Gulf of Mexico, producers (majors and independents) own 46 percent of the total offshore pipeline mileage, with concentration of their ownership in Eastern Louisiana and in Texas. Producers own the majority of the pipelines in the newer Eastern Gulf areas.

Offshore pipeline size (diameter) ranges from very small lines (e.g., 2 inches) to large diameter pipelines. The mileage distribution by size is as follows:

Diameter (Inches)				
<9	9 - 18	19 - 27	>27	Total
40%	33%	18%	9%	100%

The larger diameter pipeline (over 18 inches) makes up 27 percent of the mileage, with about 9 percent greater than 27 inches in diameter. State waters have a higher proportion of large diameter pipelines, primarily because the larger diameter lines from federal waters traverse state waters to reach onshore points. Interstate pipelines own about 85 percent of the large diameter pipelines; however, this proportion will fall when proposed lines are constructed and become operational.

Regional Summary

The following table summarizes the relative importance of each region, the largest lease holders and pipelines, pipeline ownership and location of new pipelines.

REGIONAL SUMMARY OF LEASES AND PIPELINES

	Eastern Louisiana	Central Louisiana	Western Louisiana	Texas	Eastern Gulf	Total
Proportion of Leases						
Producing	20%	35%	31%	12%	2%	100%
Non-producing	26%	26%	29%	15%	4%	100%
Largest lease holder a/	Shell 17%	Shell 10%	Shell 8%	Shell 10%	Chevron 27%	Shell 14%
Concentration of top 10 lease holders a/	72%	47%	37%	55%	89%	53%
Proportion of total pipeline mileage	15%	33%	36%	15%	1%	100%
Largest pipeline company b/	Southern 16%	Transco 14%	Tennessee 11%	Transco 32%	Chevron 31%	Transco 12%
Concentration of top 10 pipeline owners c/	69%	67%	59%	76%	100%	53%
Pipeline ownership ratio c/ Interstates/Other	36/64%	54/46%	61/39%	35/65%	6/94%	50/50%
New Pipelines c/	33%	22%	30%	7%	8%	100%

a/ Based on acreage
b/ Based on federal waters only
c/ Based on mileage

The regions with the highest proportion of producing leases also have the highest proportion of pipeline mileage. Only in the Central and Western Louisiana regions do interstate pipelines own the majority of the mileage. The 10 largest companies own the highest proportions of the pipeline mileage in offshore Texas and the Eastern Gulf, yet these are the areas where the interstate pipelines' percentages are the lowest.

II. INTRODUCTION

Foster Associates, Inc.[1] has prepared this report on behalf of the INGAA Foundation for the purpose of documenting the relative importance of the Gulf of Mexico natural gas resources in federal and state waters and the infrastructure of pipelines necessary to transport these supplies to U.S. markets. Section III presents supply statistics and information pertaining to the Gulf and Section IV identifies and describes the offshore pipelines, including their ownership, facility configuration and regulatory environment. Sections V through IX present information for five offshore regions -- their important producing areas, producers, pipelines, and development activities. Appendix A contains profiles and maps of 22 individual pipelines operating or being proposed in the Gulf. Appendix B to the report presents selected statistical data about offshore facilities.

For this analysis, Foster Associates has subdivided the Gulf of Mexico into five regions: Eastern Louisiana, Central Louisiana, Western Louisiana, Texas and the Eastern Gulf. The map on the following page depicts these regions and the smaller producing areas, including extensions or additions (e.g., Mustang Island and the area's eastern addition of offshore Texas) that comprise each larger region. The map also outlines the boundary between state and federal waters.

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[1] This research was directed by Dr. William G. Foster, assisted by Mary Jane Klipple, Rebecca Reddick, George Warholic, David Neal, Jeffrey Humin and Pat Bradley.

GULF OF MEXICO REGIONS

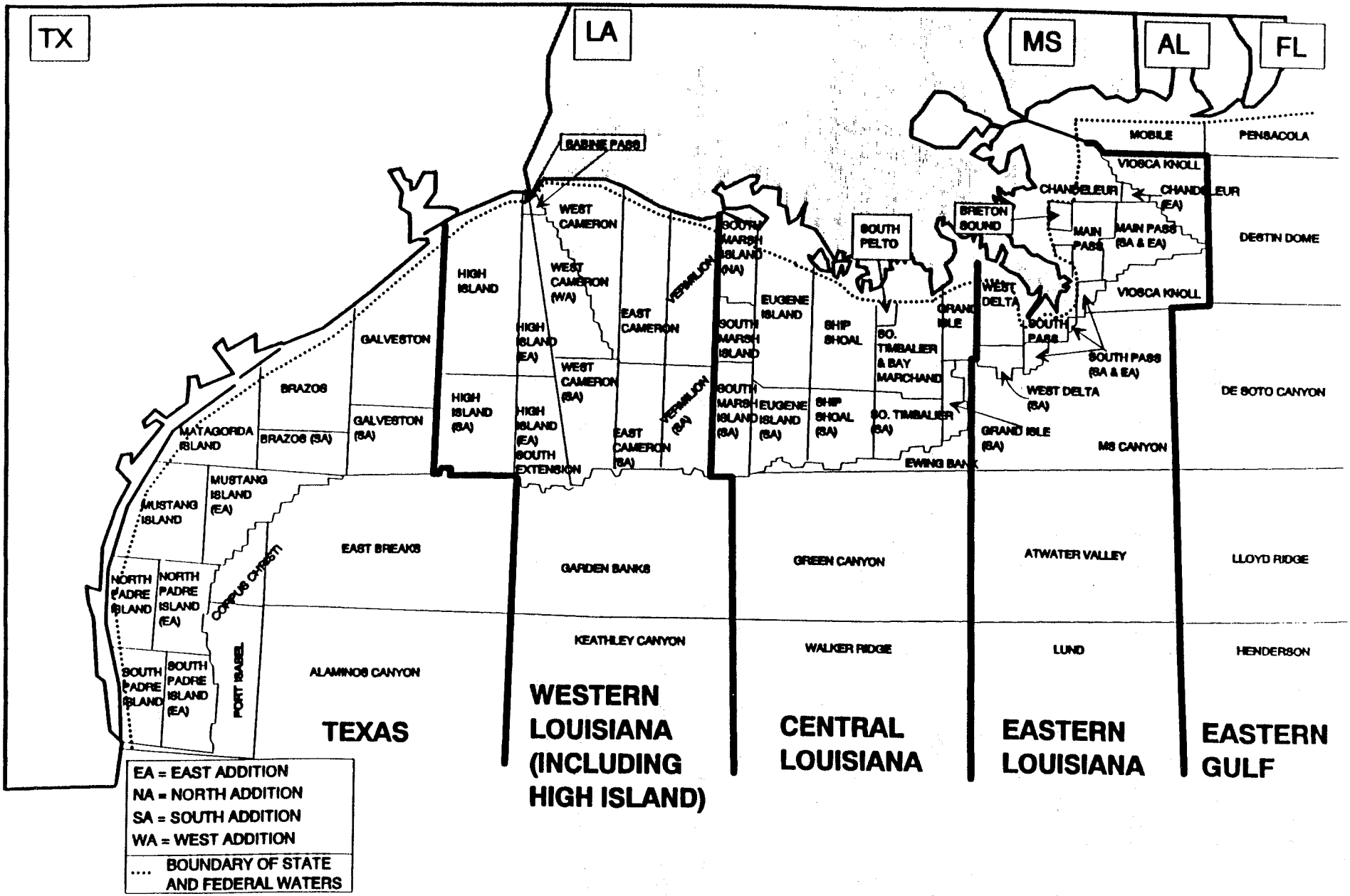

FIGURE II-1

Sources of information about Gulf of Mexico facilities include databases and reports available from the Minerals Management Service (MMS) of the U.S. Department of the Interior,[1] and the Energy Information Administration (EIA) of the U.S. Department of Energy (DOE), as well as submissions by facility owners/operators to the Federal Energy Regulatory Commission (FERC), trade press reports, annual reports to stockholders and other publicly available reports.

[1] Principal MMS sources include the report, Gulf of Mexico Update: July 1992 - June 1994, Outer Continental Shelf Oil & Gas Activities, published in 1994 (the MMS 1994 Update), and its databases of pipeline segment ownership, (the MMS Segment database) and lease ownership (the MMS Lease database).

III. GULF OF MEXICO

A. Resource Potential

The Gulf of Mexico is one of the most important natural gas supply areas in the U.S. Table III-1 compares supply statistics of the Gulf to the total Lower 48 States' gas supply.

Table III-1

U.S. NATURAL GAS SUPPLY
1994

Producing Area	Production (Dry)		Proven Remaining Reserves		Potential Resources a/	
	Tcf	%	Tcf	%	Tcf	%
Gulf of Mexico	4,725	26.4	27.2	17.7	47.9	21.3
Other Areas	13,174	73.6	126.9	82.3	177.3	78.7
U.S. (Lower 48 States)	17,899	100.0	154.1	100.0	225.2 b/	100.0

a/ Possible likely category from the Potential Gas Committee.
b/ Excludes coal bed methane of 38.2 Tcf.

Sources: Potential Supply of Natural Gas in the United States - 1994, Potential Gas Committee and U.S. Crude Oil, Natural Gas and Natural Gas Liquids Reserves 1994, EIA (DOE)

Offshore gas is produced from both oil wells (associated gas) and gas wells (non-associated gas). The table below shows the division of production and proven reserves between these type of wells.

Table III-2

PROPORTION OF GULF OF MEXICO GAS
BY TYPE OF WELL

	Associated	Non-Associated	Total
Production	13%	87%	100%
Proven Reserves	21%	79%	100%

Source: U.S. Crude Oil, Natural Gas and Natural Gas Liquids Reserves 1994, EIA (DOE)

The proportion of associated gas production in the Gulf of Mexico is about the same as other Lower 48 States gas supply areas. However, the proportion of associated proven reserves in offshore areas is higher than in other areas (21 percent versus 14 percent).

Gas produced offshore may undergo preliminary separation and treatment (e.g., dehydration) on the offshore platforms, but it must ultimately be transported to shore for additional processing. Table III-3 lists a group of onshore plants that process offshore production.[1]

Table III-3

NATURAL GAS PLANTS

Plant Name	Location	Capacity (MMcf/d)	Owner
Barracuda	Cameron Parish, LA	195	Natural Gas Clearinghouse
Blue Water	Acadia Parish, LA	950	Exxon
Cameron Meadows	Cameron Parish, LA	500	Williams/Natural Gas Clearinghouse
Garden City	Sterling Co., TX	36	Valero
Henry	Vermilion Parish, LA	860	Texaco
Lowry	Cameron Parish, LA	300	Natural Gas Clearinghouse
North Terrebonne	Terrebonne Parish, LA	1,250	Shell
Sabine Pass	Cameron Parish, LA	200	Enron
Seagull	Matagorda Co., TX	250	Tejas Power/HNG
Sea Robin	Vermilion Parish, LA	900	Texaco
Stingray	Cameron Parish, LA	300	Natural Gas Clearinghouse
Temco	Cameron Parish, LA	310	Temco
TOCA	St. Bernard Parish, LA	830	Shell
Yscloskey	St. Bernard Parish, LA	1,850	Warren (Chevron)

Source: Oil and Gas Journal, 6/12/95.

[1] In addition, a number of H_2S removal plants are located onshore, such as Mobil's plants in Mobile Co., Alabama.

The relative importance of Gulf of Mexico gas production to the U.S. total grew very rapidly from 1 to 2 percent of production in the mid 1950s to about 25 percent of supplies in 1980, and has remained at about this level ever since. As shown on Table III-1, the Gulf is the source of 26 percent of current supplies, and contains an estimated 18 percent of remaining reserves and 21 percent of the potential U.S. gas resources. Potential resources shown on the table represent the probable, possible and speculative resource estimates based on definitions developed by the Potential Gas Committee (PGC). While many areas in the Gulf of Mexico are considered to be mature areas, new and important fields continue to be discovered, especially as the continental slope and the Eastern Gulf shelf are explored further. The PGC has recently increased its speculative estimates because of exploration in the subsalt trend of offshore Texas/Louisiana.[1] The following table summarizes the PGC's minimum, likely, and maximum estimates for the three resource categories of probable, possible and speculative.

Table III-4

ESTIMATED RESOURCES OF NATURAL GAS IN THE GULF OF MEXICO OFFSHORE AREA
December 31, 1994
(Bcf)

Depth/Location	Probable			Possible			Speculative		
	Min.	Likely	Max.	Min.	Likely	Max.	Min.	Likely	Max.
0-200 Meters									
Eastern Gulf Shelf	900	1,900	3,700	800	4,800	16,800	200	6,800	15,100
Louisiana Shelf	3,900	10,500	12,700	4,200	16,200	27,800	550	3,750	11,250
Texas Shelf	1,600	3,300	6,100	3,100	8,350	14,000	300	1,500	4,050
200-1,000 Meters									
Eastern Gulf Slope	*	*	*	100	2,000	4,800	*	5,700	12,900
Louisiana Slope	400	1,400	2,500	2,500	11,500	21,200	500	3,200	9,650
Texas Slope	50	100	150	700	2,050	4,200	300	1,600	4,250
Over 1,000 Meters									
Gulf of Mexico	*	*	*	1,200	3,000	4,500	9,800	30,000	50,500
TOTAL	6,850	17,200	25,150	12,600	47,900	93,300	11,650	52,550	103,770

* Negligible quantity of natural gas estimated.
Source: Potential Supply of Natural Gas in the United States - 1994, Potential Gas Committee.

[1] Advancements in exploration (and production) technology have been among the most important factors contributing to subsalt and deepwater resource development. These advancements include the extended use of 3-D seismic readings, the use of semi-submersible rigs and drilling ships, construction of subsea production facilities tied to processing platforms, construction of tension-leg platforms, and improved computer technology (e.g., to adjust for distortions created by subsalt layers).

Focusing on the most likely possible category, almost two-thirds of the estimated resources are located in shallow waters (0-200 meters) and a majority of these are offshore Louisiana. Offshore Louisiana also has the greatest potential in water depths of 200-1,000 meters. Little exploratory drilling has been in the deepest waters; thus the PGC classifies these resources as speculative, totaling 30 Tcf under the likely scenario.

B. Gulf of Mexico Producers

While Gulf of Mexico production and lease holdings are not overly concentrated with a few large producers, these market shares exceed the U.S. average. The top 10 lease holders hold approximately 53 percent of the Gulf of Mexico acreage and the 10 largest gas producers produce 52 percent of the region's total gas production. The overall market share of the top 10 U.S. gas producers (onshore and offshore) is around 31 percent (1991 data).[1] Figures III-1 and III-2 show the largest lease holders and producers in the Gulf and their relative percentage of lease ownership and recent annual production. The largest lease holders and producers are generally the same, except for British Petroleum (BP) as a large lease holder and Unocal as a large producer.

The top 10 gas producers are generally the major integrated oil companies (e.g., Shell and Chevron); however, a few are considered to be smaller independents, such as BP and Amerada Hess. Schedule 1 of Appendix B to this report provides a list of all gas producers as reported by the MMS (see Federal Offshore Statistics: 1993). In spite of the integrated oil companies' dominance in the top 10 ranking, this list indicates that independent oil companies are important producers in federal waters, producing more than one-half of the 1993 volumes.

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[1] Source: API, Market Shares and Individual Company Data for U.S. Energy Markets 1950-1991.

FIGURE III-1
GULF OF MEXICO
TOP 10 ACREAGE HOLDERS BY PERCENT OF
TOTAL ACTIVE LEASE ACREAGE 1993

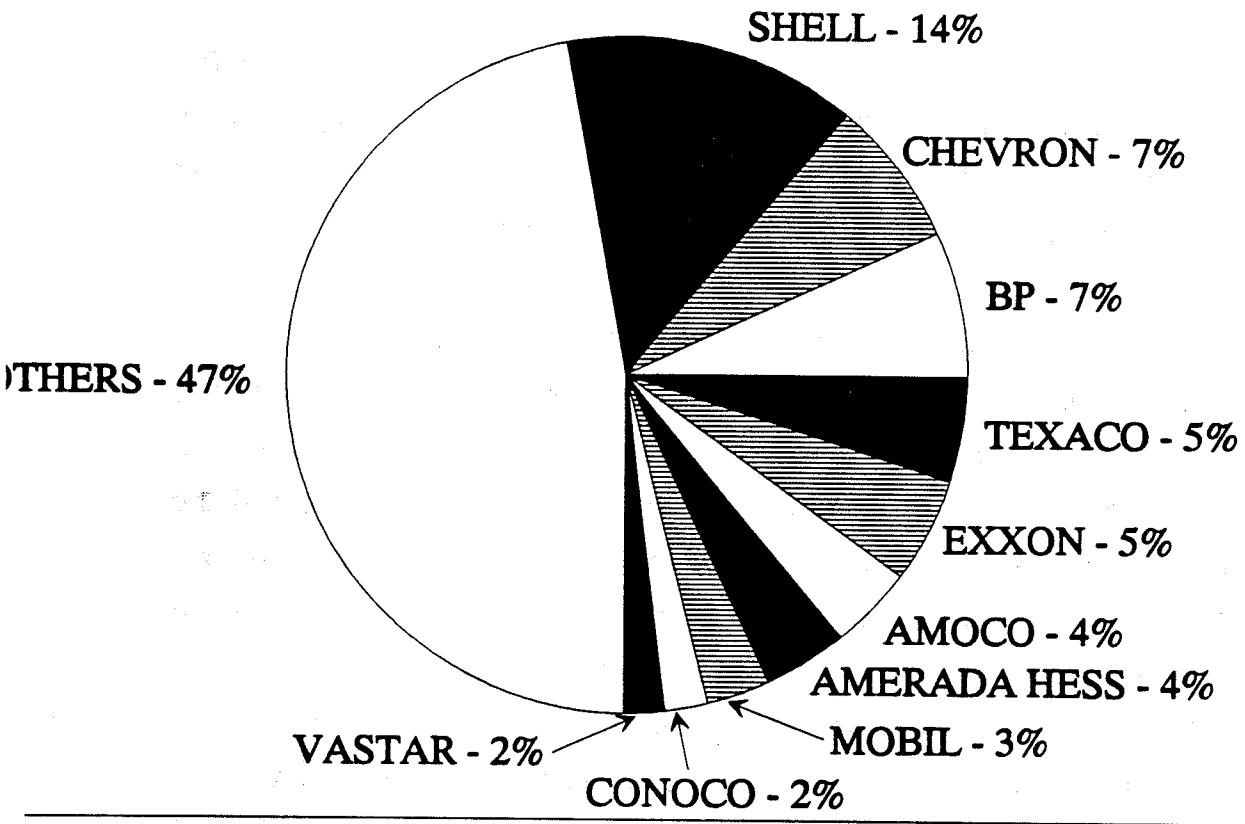
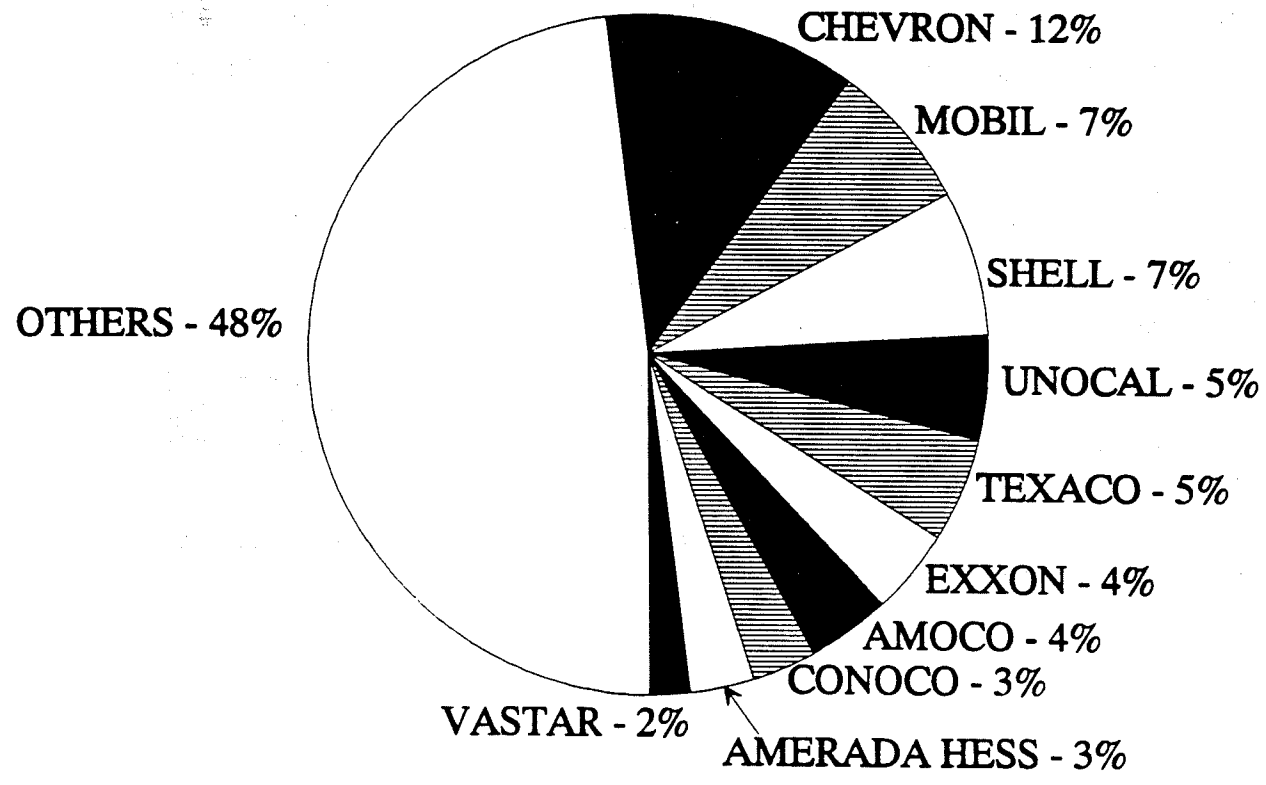


FIGURE III-2
GULF OF MEXICO
TOP 10 NATURAL GAS PRODUCERS FOR 1993



C. Gulf of Mexico Leasing

Leasing Gulf of Mexico lands for development is the responsibility of the MMS. The Outer Continental Shelf Lands Act (OCSLA) of 1953 requires the Secretary of the Interior to prepare five-year leasing schedules for the region.[1] The most recent draft leasing schedule, issued in July 1995, covers the 1997-2002 period.

The MMS divides the Gulf of Mexico into three planning areas: Western, Central and Eastern. Lease sales are generally conducted annually. However, because of a drilling moratorium affecting the Eastern Gulf, the lease sales in this area will only cover blocks in offshore Alabama and deepwater areas along the boundary of the Central and Eastern planning areas. Lease sales in the other Eastern Gulf areas will not occur until after 2000. Congress and the President have both imposed a moratorium on lease sales and development in the Eastern Gulf, in spite of significant natural gas discoveries in this area.[2] [3] For example, the industry estimates that the prospective target of exploration in the eastern waters (the Norphlet formation) contains 7 to 8 Tcf of undiscovered natural gas within the planning area. (Source: MMS, Outer Continental Shelf, Draft Proposed Oil and Gas Leasing Program 1997-2002, July 1995, page 36).

Section 18 of the OCSLA sets out several principles and factors to guide the MMS' leasing program, including energy need; economic, social and environmental

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1 The Outer Continental Shelf Lands Act, enacted in 1953 and amended in 1978, 1985 and 1986, charges the Secretary of the Department of the Interior with the responsibility for administering and managing mineral exploration and development of the OCS, as well as for conserving its natural resources.

2 An Executive Order withdraws leases in the Eastern Planning Area, south of 26°N latitude and east of 86°W longitude. The moratoria stem from Florida's general opposition to offshore drilling within 100 miles of the state's coast. In addition to the moratorium, Florida state law prohibits oil and gas leasing, exploration and development in state waters.

3 Chevron received a permit to drill offshore Florida (Block 57) in 1995; however, the MMS imposed strict stipulations (e.g., onsite spill response boats).

values; resource potential and industry interest; benefits and risks; regional needs, fair market value and laws; and goals and policies affecting the individual states.

The MMS' leasing program has five major steps: (1) solicit comments and suggestions; (2) draft the proposed five-year program; (3) consider comments about the draft program and redraft proposed program; (4) consider comments received and prepare proposed final program for submission to the President and Congress; and (5) approve program. The sales process has several specific steps, as illustrated on Table III-5, summarizing scheduled activities associated with the Gulf of Mexico lease sales proposed earlier for the 1992-1997 period.

Table III-5

GULF OF MEXICO REGION
AREA EVALUATION AND DECISION PROCESS

Planning Area/Sale	Leasing Process Steps[1/]							
	I	Call	Area ID	DEIS PNS	Hearings	FEIS CD	NOS	Sale
Eastern GOM Sale 151[2/]	3/	3/	3/	Mid 1994	Late 1994	Mid 1995	Late 1995	Late 1995
Central GOM Sale 152	3/	3/	3/	3/	3/	Late 1994	Early 1995	Early 1995
Central GOM Sale 157	3/	3/	Mid 1994	Early 1995	Mid 1995	Late 1995	Early 1996	Early 1996
Central GOM Sale 166	Early 1995	Early 1995	Mid 1995	Early 1996	Mid 1996	Late 1996	Early 1997	Early 1997
Western GOM Sale 150	3/	3/	3/	3/	3/	3/	Mid 1994	Mid 1994
Western GOM Sale 155	3/	3/	Mid 1994	Early 1994	Mid 1994	Late 1994	Mid 1995	Mid 1995
Western GOM Sale 161	3/	3/	Mid 1994	Early 1995	Mid 1995	Late 1995	Mid 1996	Mid 1996

1/ I = Information Base Review; Call = Call for Information and Nominations (45-day comment period); Area ID = Area Identification; DEIS - Draft Environmental Impact Statement; PNS = Proposed Notice of Sale (90-day comment period); FEIS = Final Environmental Impact Statement (30-day comment period); CD = Consistency Determination (90 days before decision on NOS); NOS = Notice of Sale.

2/ Note that Congress has determined that no funds may be spent for any leasing or preleasing activities associated with proposed Sale 151 in the Eastern Gulf of Mexico.

3/ Completed

Source MMS, 1994 Update.

D. Federal Versus State Waters

Pursuant to the OCSLA, the Gulf of Mexico is divided between federal and state waters, granting the states all rights to natural resources in submerged lands located within three nautical miles (5.6 kilometers) of the coast. However, for coastal waters of Texas and western Florida, the state jurisdiction extends further from the coastline to no more than three marine leagues (14.5 kilometers) into the Gulf of Mexico. In total, state waters contain 5 percent of the "actual submerged lands" acreage of offshore Gulf of Mexico.

The reserves of the federal waters contain the majority of the offshore production, as summarized on Table III-6.

Table III-6

GAS PRODUCTION OF STATE AND FEDERAL WATERS
GULF OF MEXICO
1994
(Bcf)

Waters	Louisiana	Texas	Total
State	153	79	232
Federal	3,350	1,276	4,626
TOTAL	3,503	1,355	4,858

Source: U.S. Crude Oil, Natural Gas and Natural Gas Liquids Reserves 1994, EIA (DOE)

In total, 95 percent of Gulf of Mexico (Texas and Louisiana only) gas production occurs in federal waters, 3 percent is in Louisiana state waters, and 2 percent is in Texas state waters.[1]

[1] Table III-6 summarizes offshore Texas and Louisiana areas only. The recent discoveries in the Eastern Gulf have been in the Lower Mobile Bay (state waters) and the immediately adjacent federal waters (the Norphlet trend).

As discussed in the Introduction, Foster Associates has subdivided the Gulf of Mexico into five regions (see Figure II-1) for purposes of this study. These smaller areas are more manageable than the three MMS planning areas, and they provide a better market orientation.[1] Table III-7 summarizes the production, reserves, producing leases and wells in these regions over the 1992-1994 period.

Table III-7

GAS SUPPLY DATA BY REGION
1994

Region	Pro-duction (%)	Proven Remaining Reserves (%)	No. of Producing Leases	No. of Wells Drilled (1992 - 1994)	
				Explor-ation	Develop-ment
Eastern Louisiana	9.3	13.5%	378	112	233
Central Louisiana	38.8	36.9	666	191	371
Western Louisiana	34.9	29.5	597	201	194
Texas	15.5	14.9	226	73	69
Eastern Gulf	1.5	5.2	52	10	3
TOTAL	100.0	100.0	1,919	587	870

Source: MMS, 1994 Update and Federal Offshore Statistics: 1993 and Foster Associates, Inc.

Since the mid 1950s, the MMS has leased about 26 million acres in the Gulf of Mexico. The largest proportion of the acreage leased over the past 10 to 15 years has yet to be developed. In fact, as shown on Table III-8, of the 4,966 active offshore leases, only 1,919 (39 percent) are currently producing.[2]

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[1] The MMS has three Gulf of Mexico planning areas: Western (includes offshore Texas and Western Louisiana), Central (includes Central Louisiana) and Eastern (includes Eastern Louisiana and offshore Mississippi, Alabama, and Florida).

[2] EIA reports about 12 Tcf of proven reserves in non-producing Gulf of Mexico reservoirs. These are non-producing because of operational reasons -- waiting for well workovers, drilling additional wells, installing production or pipeline facilities.

Table III-8

STATUS OF ACTIVE LEASES IN THE GULF OF MEXICO

Region	Number of Leases		
	Producing	Non-Producing	Total
Eastern Louisiana	378	787	1,165
Central Louisiana	666	783	1,449
Western Louisiana	597	881	1,478
Texas	226	478	704
Eastern Gulf	52	118	170
TOTAL	1,919	3,047	4,966

Source: MMS, Lease database

The two regions with the highest proportion of producing leases are Central Louisiana and Western Louisiana. Eastern Louisiana, Texas and the Eastern Gulf each have more than two-thirds of active leases in the non-producing category.

Compared to U.S. reserves in the aggregate, the Gulf of Mexico areas have a significantly higher proportion of the productive capacity as "unconnected capacity," according to the Natural Gas Supply Association (see Natural Gas Field Deliveries and Productive Capacity as of January 1, 1995). Offshore unconnected capacity represents 8.8 percent of total capacity, compared with only 1.2 percent of capacity for Lower 48 States areas.

E. Gas Supply Data -- by Area

Supply data for the MMS' three planning areas are shown on Table III-9.

Table III-9

GULF OF MEXICO WELLS AND PRODUCTION PLATFORMS
1993

	Western	Central	Eastern	Total
No. of Gas Wells Active	902	2,367	NA	3,269
Number of Production Facilities	480	3,277	NA	3,757 a/

a/ Distribution of Facilities:

Miles from Shore	Facilities	Meters Deep	Facilities
0-20	1,920	0-50	3,126
21-40	980	51-100	548
41-60	338	101-200	61
61-80	235	201-500	18
81-100	173	501-900	2
Over 100	111	Over 900	2

Source: MMS, Federal Offshore Statistics: 1993

In total, there are 3,269 active wells and 4,102 shut-in wells in the Gulf of Mexico. Central Louisiana is the focus of the majority of the current development and production activity in the Gulf.

As shown in the table's footnote, of the total 3,757 production platforms in the Gulf, over half of these are located within 20 miles of the coast. Eighty percent of these production facilities are in shallow waters (i.e., depths of 0 to 50 meters), while two facilities are in deep waters (i.e., depths greater than 900 meters).

Three major interest areas in the Gulf of Mexico are deepwater plays, Eastern Gulf reserves and subsalt drilling.

Major deepwater projects are underway in several areas. Deepwater gas production commenced in 1994 when Shell installed its tension leg platform in the Auger Project in Garden Banks (Block 426) at a water depth of 953 meters. Shell's Mars Project (Mississippi Canyon Block 807) also includes a tension leg platform in deep water. Several other notable projects are listed on Table III-10.

Table III-10

DEEPWATER PROJECTS IN THE GULF OF MEXICO

Project Name	Company	Location	Water Depth (Meters)	Startup Date
Zinc/Alabaster	Exxon	Mississippi Canyon 411 and 400	500	1993
Oryx 1, 2 & 3	Oryx	Mississippi Canyon 400, 401 and 445	450-700	1993
Tahoe	Shell	Viosca Knoll 783	483	1993/94
Pompano	BP	Viosca Knoll 989 and 990 and Mississippi Canyon 23, 28 and 72	430	1994
Auger	Shell	Garden Banks 426	953	1994
Cooper	Enserch	Garden Banks 388	700	1995
Popeye	Shell	Green Canyon 116	773	1995
Mars	Shell/BP	Mississippi Canyon 807	978	1996
Neptune	Oryx	Viosca Knoll 826	667	1997
Mensa	Shell	Mississippi Canyon	1,800	1997
Ram-Powell	Shell, Exxon, Amoco	Viosca Knoll 956 (8 blocks)	1,060	1997
Fuji	Texaco	Green Canyon 506	1,414	1998
Gemini	Texaco	Mississippi Canyon 292	1,133	1998

Source: Energy Ventures Analysis, Inc.

The eastern Gulf of Mexico discoveries have been particularly significant in the Mobile Bay area in both state and federal waters. One promising area is the Norphlet trend, estimated to contain 7 to 8 Tcf of recoverable reserves.

Finally, the subsalt trend of the Gulf may offer enormous promise in light of recent drilling successes. The subsalt trend covers more than 36,000 square miles in

water depths from 100 to 700 meters. This trend extends from the Eastern Louisiana region (e.g., Mississippi Canyon) to offshore Texas (e.g. East Breaks). Most deep water areas have this layer of underwater salt, causing distorted seismic readings and other problems that make exploration efforts difficult. Phillips (e.g., Mahogany Prospect in the Ship Shoal area) and others have proven that subsalt drilling technology (e.g., the use of improved computer technology and 3-D seismic equipment) may allow potential resource development that at one time was not possible in a wide area of the Gulf .

IV. GULF OF MEXICO PIPELINES

A. Offshore Pipelines by Location and Size

About 130 companies operate pipelines in the Gulf of Mexico state and federal waters to bring offshore gas onshore for processing and delivery to markets. Schedules 2 and 3 in Appendix B to this report summarize pipeline mileage for those operating in federal and state waters, respectively. Schedule 4 lists segment detail[1] for pipelines operating in federal waters, and Schedule 5 shows similar data for pipelines operating in state waters. For both groups, we list the owner/operator, area of origin, destination, pipeline length, diameter, status and (for federal water pipelines) type of pipeline (e.g., gas or gas/oil). The primary source for the offshore federal pipeline information is the MMS Segment database. Foster Associates has updated this information for recent name and ownership changes announced in the trade press, as well as for a number of newly announced projects (e.g., Shell's Mississippi Canyon project). The state offshore pipeline data were compiled by Foster Associates using maps, annual reports to stockholders, and various other publicly available sources.

The Gulf of Mexico has an estimated 14,773 miles of active gas pipelines in state and federal waters. In addition, there are proposed and abandoned facilities, as shown on Table IV-1.

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[1] A segment is defined as a contiguous line of one diameter.

Table IV-1

SUMMARY OF PIPELINE MILEAGE STATUS

Status	Miles	Percentage
Active		
Federal	13,386	78.9%
State	1,387	8.2%
Total	14,773	87.1%
Proposed	775	4.6%
Abandoned a/	1,415	8.3%
TOTAL	16,963	100.0%

a/ Federal only.

Source: Appendix B, Schedules 2 and 3

Of the active mileage in state waters, many miles represent offshore pipelines originating in federal waters but traversing state waters to reach onshore points. However, some of these pipelines gather gas from state waters as well, including Southern Natural Gas, Florida Gas Transmission and Tennessee Gas Pipeline.

Table IV-2 summarizes the distribution of the pipeline mileage in each region.

Table IV-2

SUMMARY OF ACTIVE OFFSHORE PIPELINE MILEAGE

Region	Federal	State	TOTAL
Mileage			
Eastern Louisiana	2,047	162	2,209
Central Louisiana	4,617	215	4,832
Western Louisiana	5,094	177	5,271
Texas	1,511	772	2,283
Eastern Gulf	117	61	178
Total	13,386	1,387	14,773
Proportion			
Eastern Louisiana	13.9%	1.1%	15.0%
Central Louisiana	31.3%	1.5%	32.7%
Western Louisiana	34.4%	1.2%	35.6%
Texas	10.2%	5.2%	15.5%
Eastern Gulf	0.8%	0.4%	1.2%
Total	90.6%	9.4%	100.0%

NOTE: Totals may not compute due to independent rounding of components.

Source: MMS, Segment database and Foster Associates, Inc.

Western and Central Louisiana federal waters have more mileage than the other regions, 35 and 31 percent, respectively. These mileage percentages are fairly consistent with these regions' relative proportion of producing leases in federal waters -- 31 and 35 percent, respectively. State water pipeline mileage in offshore Texas and in the Eastern Gulf is relatively high (compared to federal water mileage), perhaps reflecting the wider boundary distance between the shore and the start of the federal waters for these states. Also, some of the long pipelines in Texas state waters run parallel to the coast for considerable distances.

Offshore pipeline size (diameter) ranges from very small lines (e.g., 2 inches) connected to individual leases to large diameter lines generally transporting gas to onshore points. Table IV-3 presents the distribution of the pipeline mileage in the Gulf of Mexico by pipe diameter.

Table IV-3

OFFSHORE PIPELINE MILEAGE BY DIAMETER
(Active Pipelines)

Waters	Diameter (Inches)				
	<9	9 - 18	19 - 27	>27	Total
State	28.0%	36.7%	30.5%	4.8%	100%
Federal	41.1%	32.7%	17.1%	9.1%	100%
Total	39.9%	33.1%	18.3%	8.7%	100%

Source: MMS, Segment database and Foster Associates, Inc.

On a mileage basis, relatively small diameter pipe (2- to 8-inch) makes up 40 percent of offshore pipeline mileage while large diameter pipe (over 18 inches) makes up just over one-quarter of the mileage, of which 9 percent is greater than 27 inches in diameter. State water pipelines have a larger proportion of large diameter pipe, i.e.,

35 percent with diameter of over 18 inches. A primary reason for this is the larger diameter pipes from federal waters that traverse state waters to reach onshore points.

Different types of pipelines operate in offshore waters -- some transport only gas and others transport gas and liquids. Table IV-4 summarizes the regional proportions of gas and gas/liquids (condensates and oil) pipeline mileage in federal waters.

Table IV-4

FEDERAL OFFSHORE PIPELINE MILEAGE
BY TYPE OF PIPELINE

Region	Gas a/	Gas/Liquids b/	Total
Eastern Louisiana	85.5%	14.5%	100%
Central Louisiana	80.0	20.0	100
Western Louisiana	83.6	16.4	100
Texas	60.8	39.1	100
Eastern Gulf	73.5	26.5	100
Total	80.1	19.9	100

a/ Includes "BLKG" segments defined as gas stream (pipeline) prior to processing. The category is 20 percent of the total.
b/ Condensates and oil.

Source: MMS Segment database

As expected, the percentage of total pipeline mileage represented by gas/liquids facilities (19.9 percent) is fairly close to the proportion of offshore associated gas supply (13 percent). In addition to these supplies, the MMS designates a number of the gas pipeline segments as "BLKG," defined as "Full Well Stream Production From Gas Well(s) Prior to Processing." In the aggregate, these segments represent 20 percent of the total offshore mileage. Oil companies own two-thirds of the gas/liquids facilities and almost all of the "BLKG" lines.

B. Offshore Pipeline Ownership

The 20 largest offshore pipeline owners/operators identified on Table IV-5 own 71 percent of the mileage in federal waters.[1] Figure IV-1 shows the ownership proportions of the 10 largest pipeline owners/operators. In the aggregate, the 10 largest companies own 53 percent of the mileage. Two are producers and eight are interstate pipelines. Six producers and four interstate pipelines are in the second ownership tier.

[1] A number of pipelines are jointly owned. If the pipeline is operated by one of the owners, the mileage is tabulated with the pipeline operator. If the pipeline is self-operated, it is tabulated as a stand-alone pipeline.

Table IV-5

LARGEST GULF OF MEXICO PIPELINE OWNERS
FEDERAL WATERS AND ACTIVE PIPELINES ONLY

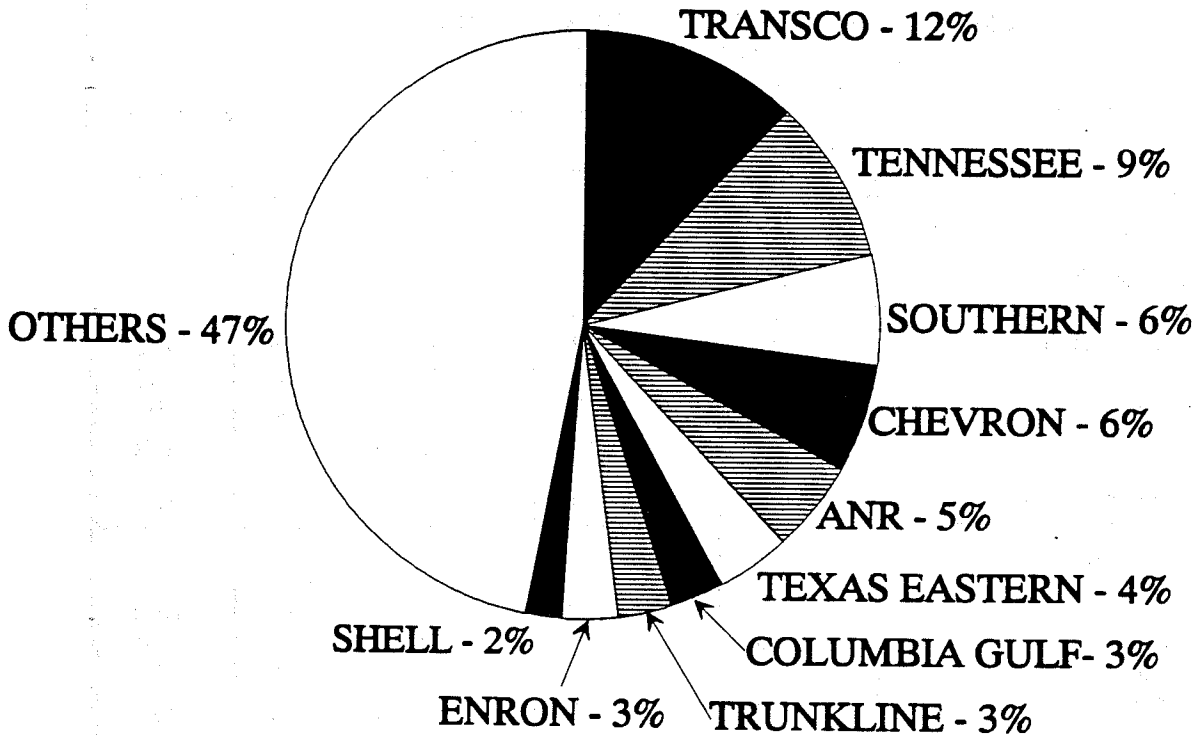
Company	Mileage	Percent
Transcontinental	1,560	11.7
Tennessee	1,141	8.5
Southern a/	862	6.4
Chevron	761	5.7
ANR	675	5.0
Texas Eastern	588	4.4
Columbia Gulf	406	3.0
Trunkline	402	3.0
Enron e/	330	2.5
Shell	320	2.4
Stingray b/	318	2.4
Koch Gateway	279	2.1
Exxon	275	2.1
Apache	243	1.8
Pennzoil	243	1.8
Unocal	238	1.8
Texaco	231	1.7
Mobil	227	1.7
High Island c/	204	1.5
Natural	192	1.4
Top 20 Subtotal	9,495	70.9
Others d/	3,891	29.1
TOTAL	13,386	100.0

a/ Includes Sea Robin.
b/ Owned by Natural and Leviathan.
c/ Owned by ANR, Natural and Leviathan.
d/ 114 companies.
e/ Includes Northern Natural, Florida Gas Transmission, Houston Pipe Line, Black Marlin and Enron's own facilities.

NOTE: Totals may not compute due to independent rounding of components.

Source: MMS, Segment database.

FIGURE IV-1
TOP 10 OFFSHORE PIPELINES BY MILEAGE
(FEDERAL WATERS)



The concentration of pipeline ownership (e.g., the top 10 companies hold 53 percent) is consistent with market concentration of production in the Gulf. As shown earlier in Figures III-1 and III-2, the top 10 producers represent 52 percent of the area's production and the top 10 leaseholders control 53 percent of active leases.

Table IV-6 shows the distribution of offshore (federal and state) pipeline mileage by type of owner.

Table IV-6

SUMMARY OF PIPELINE OWNERSHIP/OPERATION
BY LOCATION AND DIAMETER
(Percentage Distribution)

	Interstate Pipelines	Major Producers	Indepen-dents	Pipeline Affiliates	TOTAL
A. Pipeline Location (by origin)					
Eastern Louisiana	32%	31%	32%	5%	100%
Central Louisiana	54	23	22	1	100
Western Louisiana	60	12	22	6	100
Texas	39	7	46	8	100
Eastern Gulf	10	46	21	23	100
State Waters	44	18	35	3	100
TOTAL OWNERSHIP	50	19	27	4	100
B. Pipeline Diameter					
<9 inches	16%	30%	50%	4%	100%
9-18 inches	63	14	18	5	100
19-27 inches	79	8	9	4	100
>27 inches	99	1	-	-	100
TOTAL OWNERSHIP	50	19	27	4	100

Source: MMS, Segment database and Foster Associates, Inc.

Interstate pipelines own about half of the offshore mileage (including state waters), primarily in the Central and Western Louisiana regions. Pipeline affiliates own and operate facilities primarily in Texas and Western Louisiana, representing about 4 percent of the total mileage. To some extent, this ownership reflects interstate

pipelines' spindowns of gathering lines, as a result of service unbundling and restructuring pursuant to FERC's Order No. 636. Selected examples of recent spindowns of offshore gathering lines and spinoffs of such facilities to independent third parties are offered on Table IV-7.[1] (For discussion of FERC's criteria for declaration of gathering lines, see Offshore Pipeline Regulation, section D.)

Table IV-7

SUMMARY OF MAJOR SPINOFFS AND SPINDOWNS
OF INTERSTATE PIPELINES' OFFSHORE GATHERING SYSTEMS a/

Pipeline	Region	Spinoff		Spindown	
		Miles	Diameter (Inches)	Miles	Diameter (Inches)
CNG	Central LA	–	–	16	2-8"
	Central LA	–	–	12	9-17
	Western LA	6	<6"	18	9-17
	Western LA	16	12 - 16	=	–
	Total	22	6 - 16	46	2 - 17
El Paso	Western LA	–	–	2	8
	Western LA	=	=	20	16 - 20
	Total	–	–	22	8 - 20
Northern Natural a/	Texas b/	–	–	107	10 - 24
	Texas b/	=	=	2	2 - 8
	Total	–	–	109	2 - 24
Panhandle Eastern	Western LA	15	NA	–	–
Tennessee	Central LA	6	9	–	–
	Western LA	2	6 - 10	=	=
	Total	8	6 - 10	–	–
Texas Eastern	Central LA	5	8	–	–
	Central LA	5	12	=	=
	Total	10	8 - 12	–	–

a/ Includes partially owned facilities.
b/ Pending Commission approval. Includes certain facilities located onshore.

Source: Foster Associates, FERC filings, and trade press articles.

[1] Spindown occurs when an interstate pipeline transfers facilities to non-regulated affiliates. Spinoff occurs when facilities are sold to an independent company.

The major integrated oil companies own 19 percent of the total mileage and independent producers own 27 percent, for a total producer share of 46 percent. The major producers are concentrated (in terms of mileage) in Eastern Louisiana, while the independent producers own facilities in Eastern Louisiana as well as Texas. In fact, independents own almost half of the offshore Texas mileage (federal waters). Producers own the vast majority of the pipelines in the newer Eastern Gulf areas.

C. Recent Pipeline Activity

Since 1990, 2,775 miles of gas pipelines have been constructed in federal offshore waters. Stated otherwise, over 20 percent of the active offshore pipelines have been constructed in the past five years. Construction activities have focused particularly on the Eastern Gulf and the Eastern Louisiana regions. Independent gas producers have been the primary owners of these new pipelines:

Table IV-8

SUMMARY OF OFFSHORE PIPELINES CONSTRUCTED BETWEEN 1990 AND 1995 BY OWNERSHIP TYPE

Interstate pipelines	18%
Major oil companies	21%
Independents	57%
Pipeline affiliates	4%
TOTAL	100%

About 775 miles of new pipelines are currently proposed and/or under construction in the Gulf of Mexico. As shown on Table IV-9, a majority of the proposed mileage will be owned by gas producers and/or independent (non-integrated) companies rather than interstate pipelines.

Table IV-9 SUMMARY OF PROPOSED OFFSHORE PIPELINES BY OWNERSHIP TYPE		
Category	Mileage	Percent
Interstate Pipelines	48	6
Major Oil Companies	303	39
Independents	391	51
Pipeline Affiliates	33	4
Total	775	100

Source: MMS, Segment database and Foster Associates, Inc.

Although these new lines are being planned throughout the offshore area, the greatest concentration occurs in offshore Louisiana waters:

Eastern Louisiana	33%
Central Louisiana	22
Western Louisiana	30
Texas	7
Eastern Gulf	8
	100%

Several large-diameter projects are underway or have been constructed recently in the Gulf:[1]

- Main Pass Gathering Co. (a partnership between Centana Gathering and CNG Main Pass Gathering) recently began constructing a 30-mile, 20-inch pipeline and a 5-mile, 12-inch pipeline from the Main Pass area to interconnect with Texas Eastern; in addition there will be a 17-mile, 8-inch line from the Main Pass area to the Viosca Knoll area.

[1] Greater details pertaining to a number of projects are included in Appendix A.

- Dauphin Island Gathering System is a partnership between OEDC, Enron Gas Gathering and Tenneco. It has recently (1994/95) constructed 70 miles of pipe from the Viosca Knoll area to Mobile Bay and Alabama state waters, to add to its existing 22-mile system offshore. Construction included the following:

  24 miles of 20-inch diameter line
  39 miles of 12-inch diameter line
  7 miles of 8-inch diameter line
  70 miles

- EP Operating is constructing a new 54-mile, 12-inch diameter line extending from Garden Banks to the Eugene Island area.

- Shell's Mississippi Canyon Gathering System is a proposed three-segment pipeline extending from new deepwater projects in the Mississippi Canyon area to the West Delta area and to the Venice processing plant onshore. Total system mileage is

  45 miles of 30-inch diameter line
  45 miles of 14-inch diameter line
  68 miles of 12-inch diameter line
  158 miles

- Viosca Knoll Gathering System (jointly owned by Leviathan and Tenneco) is a 95-mile, 20-inch diameter project from the Main Pass area to interconnect with Tennessee in the South Pass area. This project went into service in November 1994. The project also has a 6-mile, 16-inch diameter proposed lateral from Viosca Knoll to interconnect with Southern in the Main Pass area.

D. Offshore Pipeline Regulation

Regulatory authority over offshore pipelines is vested in several agencies:

- The MMS has the responsibility to award permits to pipelines that transport gas and other products across the OCS. The approval process covers design, fabrication and installation plans, as well as the granting of rights-of-way for the pipeline and accessory structures. Section 5(e) of the OCSLA states that pipelines with approved permits operate in accordance with competitive principles, except when FERC has exempted a pipeline "which feeds into a facility where oil and gas are first separated, dehydrated, or otherwise processed" (Sec. 5(h)(2)). These competitive principles include open and nondiscriminatory access to both owner and nonowner shippers, and the requirement to expand capacity after FERC finds economic feasibility and that expansion is within technological limits.

  Although Section 5(e) of the OCSLA grants "rights-of-way" responsibility to the MMS, it also requires consultation with the Secretary of Transportation to assure environmental protection and safety. This provision also requires that gas (and oil) be transported without discrimination, pursuant to FERC standards.

- The U.S. Department of Transportation enforces pipeline safety regulations for onshore and offshore transportation of oil and gas. Such responsibility includes review of pipeline permit applications and construction plans and review of accident reports.[1]

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[1] In addition, the U.S. Army Corps of Engineers is responsible for pipeline structures placed within navigable waters.

- State authority over pipelines operating in state waters is generally restricted to public utilities and safety issues. In Texas, although rates between intrastate pipelines and large customers are required to be on file with the Railroad Commission, they are deemed "just and reasonable" if no complaints are filed and they meet one of three criteria: (1) neither party has an unfair advantage; (2) rates are substantially the same for similar services; or (3) services are provided in a competitive market. The Railroad Commission has no jurisdiction to require a pipeline to provide service to a third party. In Louisiana, the Public Service Commission has no authority over intrastate pipelines' service to large customers. The Conservation Commission does have jurisdiction over pipeline safety and the prevention of waste. Alabama's Public Service Commission's regulations focus on distributors. Rates and tariffs of intrastate pipelines are not on file with the Commission; however, the Commission Staff reviews transportation contracts and construction schedules and plans of the intrastate pipelines.

- FERC's regulatory authority over interstate pipelines stems from the Natural Gas Act (NGA) and the OCSLA. Interstate pipelines that have not been declared non-jurisdictional via the gathering exception of the NGA (Section 1(b)) must obtain a certificate of public convenience and necessity to construct, acquire, extend, operate and/or abandon facilities. Applications for such a certificate must include maps and diagrams, legal name and type of business, proposed service, product description and appropriate economic/cost information and data.

Jurisdictional offshore interstate pipelines are also subject to FERC rate regulation under Sections 4 and 5 of the NGA. The important rate criteria under these sections include the "just and reasonable" standard and prohibition against undue preference. The Commission has generally

followed a cost of service (revenue requirement) procedure in establishing these rates. Interstate pipelines' offshore transportation rates on file at FERC cover both gathering and transmission services. Firm and interruptible services are being offered. Firm rates are generally designed on a straight fixed-variable (SFV) cost allocation basis.

Even when FERC has allowed a transfer of a gathering facility to a pipeline affiliate (spindown), the Commission has retained certain authority to address potential affiliate abuses. For instance, there must be nondiscriminatory access and nonpreferential treatment, and FERC prohibits tying of pipeline transportation service to any service by, on behalf of, or involving the pipeline's gathering affiliate.

Another condition imposed by FERC, applicable to both spindowns of gathering facilities to affiliates and sales to nonaffiliates (spinoff), requires successors to demonstrate that existing customers served by the gathering facilities have been offered an opportunity to continue service under acceptable terms, conditions and rates for a two-year period.

There are two important distinctions between a FERC jurisdictional pipeline and a non-jurisdictional pipeline. In the first place, a jurisdictional pipeline must receive a certificate of public convenience and necessity from the FERC prior to commencing service. A non-jurisdictional pipeline does not need such a certificate. And secondly, jurisdictional pipelines are subject to rate regulation by the Commission, while non-jurisdictional pipelines are free to negotiate rates with their customers. Both types of pipelines have to receive construction permits from the MMS and they have to abide by the open access and non-discriminatory requirements of the OCSLA, unless exempted by the FERC.

As stated above, the NGA Section 1(b) exempts gathering activities and facilities from FERC's jurisdiction. Currently, about half of all offshore pipelines are operating under non-jurisdictional status resulting from (1) a successful petition to the FERC for disclaimer of jurisdiction, (2) presumption by the pipeline owner of this status, or (3) the smallest category, spindowns and spinoffs (see above).

The Commission uses several criteria in its "Modified Primary Function" test to determine if the activities and facilities are gathering and thereby non-jurisdictional:

Physical and Geographical

- Length & diameter of the line
- Extension beyond the central point of the field
- Line's geographic configuration
- Location of compressors and processing plants
- Location of wells along the line
- Operating pressure
- Proposed location and operation of the facility

Non-Physical

- General business of the owner
- Whether jurisdictional determination is consistent with NGA and NGPA

These criteria are generally applied to both onshore and offshore gathering facility determination. However, in an Amerada Hess case[1] the Commission modified its "primary function" test to recognize the changing technology and geography of offshore production areas (e.g., moving of activities and facilities farther offshore). As a result, the Commission has allowed longer pipeline distances and larger diameter offshore facilities to be classified as gatherers.

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[1] 52 FERC ¶ 61,268 (1990).

In addition to this increased length and diameter, the existence of compressors and processing plants has generally not precluded offshore pipelines from being classified as gatherers. Gas plants that process (e.g., extract liquids from) offshore production are generally located onshore. Some of the more important plants, generally owned by vertically integrated oil companies, were listed earlier in Table III-3.

Similar to plants that process offshore production, most compressor stations are located onshore with some horsepower owned by producers and pipelines located offshore on production platforms. Offshore pipelines generally rely on well pressure to achieve necessary compression, although there are exceptions. Just 49 offshore interstate pipeline compressors have been identified, of which 20 are transportation compressors and 29 are small field compressors.

The "Modified Primary Function" test is applied by the Commission in assessing jurisdictional status of facilities. Within the past few years, numerous companies have filed for non-jurisdictional status, and many of the requests have been for relatively large diameter pipelines, e.g., Blue Dolphin and Viosca Knoll Gathering.

Therefore, not all large diameter offshore pipelines are under FERC jurisdiction as interstate pipelines. Table IV-10 lists over 760 miles of non-jurisdictional lines with diameters varying from 20 to 30 inches. These large diameter lines include state water facilities and several proposed new lines, e.g., Shell.

Table IV-10

LARGE DIAMETER* NON-JURISDICTIONAL PIPELINES

Owner/Operator	Location	Length (Miles)	No. of Segments	Diameter
Amerada Hess	W. Cameron (WLA)	4	1	20"
Amoco	Vermilion (WLA) Vermilion (WLA - State)	6 4	2 1	20" 20"
Blue Dolphin	Galveston (TX)	38 a/	2	20"
Centana (Proposed)	Main Pass (ELA) Main Pass/Viosca Knoll (ELA)	30 17	1 1	20" 20"
Chevron	West Delta (ELA) West Delta (ELA - State) S. Timbalier (CLA)	25 9 127	6 3 6	20-26" 20-26" 20-26"
CNG Producing	High Island (WLA) E. Cameron (WLA)	7 5	1 1	20" 20"
Dauphin Island	Mobile Bay & Alabama State Waters (Eastern Gulf)	35 b/	5	20"
Exxon & Hunt	Mobile Bay (State)	35	4	28"
Flores & Rucks	South Pass (ELA)	2	1	20"
HPL	South Padre Island (TX - State) Matagorda Island (TX - State)	59 9	1 1	20" 20"
Leviathan	S. Timbalier (CLA) S. Marsh Island (CLA)	18 25	1 1	24" 20"
L.I.G.C.	Bay Marchand (CLA - State)	2	1	24"
Matagorda Offshore PL System	Matagorda Island (TX - State)	11	1	24"
Mobil	Mobile Bay (Eastern Gulf) Mobile Bay (State)	10 0.5	1 1	20" 20"
Mustang Island Gathering Sys.	Mustang Island (TX - State)	10	1	20"
Shell Shell (Proposed)	Ship Shoal (CLA) West Delta (ELA)	4 45	1 1	22" 30"
Tejas Power (Cavallo)	Matagorda Island (TX - State)	9	1	20"
Tejas Power (Seagull)	Matagorda Island (TX - State) Brazos (TX - State) Galveston (TX - State)	37 2 30	2 1 1	24" 20" 20"
Texaco	S. Marsh Island (CLA) S. Marsh Island (CLA - State) Eugene Island (CLA - State)	5 25 11	1 2 1	30" 20-30" 24"
Tomcat	Matagorda Island (TX - State)	11	1	20"
Viosca Knoll	Viosca Knoll/Main Pass (ELA)	95	1	20"
Total		762.5	57	20-30"

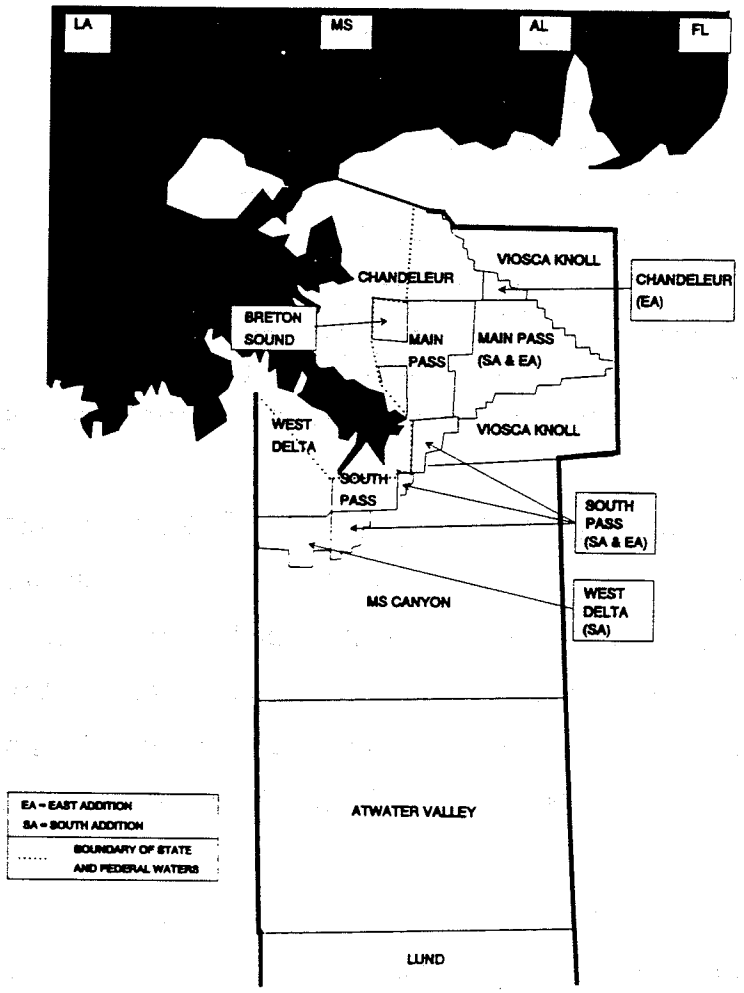
* 20" or larger

a/ Includes state waters (15 miles)
b/ Includes 24 miles of newly constructed lines.
Source: MMS. Segment database and Foster Associates, Inc.

V. EASTERN LOUISIANA REGION

The map below depicts Foster Associates' Eastern Louisiana region.

EASTERN LOUISIANA



This region produces 9 percent of the Gulf of Mexico's production and has 13 percent of the remaining recoverable reserves. It consists of eight major areas (including additions) and supply characteristics of each are presented in Table V-1.

Table V-1

GAS SUPPLY DATA FOR EASTERN LOUISIANA
1994

Area	Pro-duction (%)	Proven Remaining Reserves (Bcf)	No. of Wells Drilled (1992 - 1994)	
			Explor-ation	Develop-ment
West Delta	26.5	557	18	54
South Pass	27.4	899	11	65
Mississippi Canyon	0.8	1,000	17	39
Main Pass	40.3	971	55	60
Chandeleur	1.9	500	1	2
Breton Sound	3.1	NA	0	0
Viosca Knoll	NA	NA	10	13
Atwater Valley	NA	NA	NA	NA
TOTAL	100.0	3,927	112	233

Source: MMS, 1994 Update and Federal Offshore Statistics 1993, and Foster Associates, Inc.

The Main Pass area had the greatest production in 1994 and the highest level of drilling activity in 1992-94. While the Mississippi Canyon area represents less than 1 percent of the current gas production, this deepwater area has 25 percent of the total discovered reserves. As will be discussed, much of the deepwater drilling for both exploration and development purposes is being conducted in the area, and as a result, there are several new pipeline projects (e.g., Shell's Mississippi Canyon project).

One measure of potential development in Eastern Louisiana is the number of acquired leases and whether they are producing or not. As shown on the following table, only about one-third of the leases acquired in this area are currently under production.

Table V-2

STATUS OF ACTIVE EASTERN LOUISIANA LEASES

Area	Number of Leases		
	Producing	Non-Producing	Total
Atwater Valley	5	125	130
Breton Sound	7	3	10
Chandeleur	12	5	17
Main Pass	113	108	221
Mississippi Canyon	68	370	438
South Pass	43	21	64
Viosca Knoll	50	123	173
West Delta	80	32	112
Total	378	787	1,165

Source: MMS, Lease database

Of the 1,165 outstanding leases, 787 (or 68 percent) are currently non-producing. Further exploration and development, as well as pipeline construction, will be necessary to bring these on line.

Shell is the largest holder of leases in this region, with 17 percent of the total. As shown on Table V-3, the top 10 lease holders control 57 percent of the producing leases and 79 percent of the non-producing leases.

Table V-3

SUMMARY OF EASTERN LOUISIANA LEASES
BY OWNER AND LEASE TYPE

Owner	Proportion of Leases Owned (Percent)		
	Producing	Nonproducing	Total *
Shell Offshore	13.3%	18.5%	16.8%
BP Exploration	3.7	18.0	13.3
Chevron USA Inc.	15.2	9.5	11.4
Exxon Corp.	9.5	5.8	7.0
Mobil Oil Exploration & Prod.	2.8	6.1	5.0
Vastar Resources	4.6	4.9	4.8
BHP Petroleum Americas	0.4	6.7	4.6
Texaco Exploration and Prod.	2.3	4.6	3.9
Amoco Production Company	1.8	3.2	2.7
Samedan Oil Corporation	3.4	1.3	2.0
Others (158 companies)	42.9	21.2	28.4
Total *	100.0	100.0	100.0

* Totals may not compute due to independent rounding.

Source: MMS, Lease database

Table V-4 identifies several new (1994/1995) producible wells and/or discoveries in Eastern Louisiana.

Table V-4

NEW PRODUCIBLE GAS WELLS
EASTERN LOUISIANA

Area	Block	Flow (MMcf/d)	Water Depth (Meters)	Operator
Main Pass	223	a/	86	Coastal Oil & Gas
Mississippi Canyon	6 blocks	60 b/	450	Oryx
South Pass	89	16	NA	Box Energy
South Pass	60	18	NA	Vastar Resources
South Pass	89	28	NA	Box Energy
West Delta	106	12 b/	NA	Vastar Resources
West Delta	18	18	NA	Newfield Expl.

a/ Platform capable of producing 100 MMcf/d.
b/ Production capability.

Source: Trade press articles.

One of the more important developments in Eastern Louisiana is deepwater drilling.[1] Some of the notable deepwater drilling projects are shown on the following table.

[1] Some subsalt drilling activity is occurring in Eastern Louisiana (e.g., Exxon is drilling on Mississippi Canyon Block 211). However, the greater subsalt activity is in Central Louisiana.

Table V-5

MAJOR DEEPWATER PROJECTS IN EASTERN LOUISIANA

Project Name	Company	Location	Water Depth (Meters)	Startup Date	Peak Production	
					Oil (MBD)	Gas (MMcf/d)
Cognac	Shell	Mississippi Canyon 148	342	NA	NA	230
Zinc/Alabaster	Exxon	Mississippi Canyon 411 and 400	500	1993	0.6	150
Oryx 1, 2 & 3	Oryx	Mississippi Canyon (3 blocks)	450-700	1993	NA	60
Tahoe	Shell	Viosca Knoll 783	483	1993/94	NA	100
Pompano	BP	Viosca Knoll 989 and 990 and Mississippi Canyon 23, 28 and 72	430	1994	40	50
Mars	Shell/BP	Mississippi Canyon 807	978	1996	100	110
Neptune	Oryx	Viosca Knoll 826	667	1997	15	30
Mensa	Shell	Mississippi Canyon	1,800	1997	NA	300
Ram-Powell	Shell, Exxon, Amoco	Viosca Knoll 956 (covers 8 blocks)	1,060	1998	60	200
Petronius	Texaco	Viosca Knoll 786	585	1998	NA	4.4 b/
Gemini a/	Texaco	Mississippi Canyon 292	1,133	1998	NA	NA

a/ Also a subsalt project.
b/ Initial flow.

Source: Trade press articles, annual reports and Energy Ventures Analysis, Inc.

The following table summarizes the state and federal offshore gas pipeline mileage in Eastern Louisiana.

Table V-6

SUMMARY OF PIPELINE MILEAGE STATUS
EASTERN LOUISIANA

Status	Miles	Percentage
Active		
Federal	2,047	79.0%
State	162	6.2
Total	2,209	85.3
Proposed	258	10.0
Abandoned a/	123	4.7
TOTAL	2,590	100.0%

NOTE: Totals may not compute due to independent rounding.

a/ Federal only.

Source: Appendix B, Schedules 2 and 3

This region contains 15 percent of the active gas pipeline mileage in the Gulf of Mexico waters, compared with 20 percent of the active producing leases. However, over one-third of the new pipeline mileage developments are in this region, primarily in the Viosca Knoll and Mississippi Canyon areas. Projects include the following:

- Shell's Mississippi Canyon Gathering System is a proposed three-segment pipeline extending from new deepwater projects in the Mississippi Canyon area to the West Delta area and to the Venice processing plant onshore. This project consists of 45 miles of 30-inch pipe, 45 miles of 14-inch pipe, and 68 miles of 12-inch pipe, for a total of 158 miles.

- Viosca Knoll Gathering System, owned by Leviathan and Tenneco, is a 95-mile, 20-inch project from the Main Pass area to interconnect with Tennessee in the South Pass area. The pipeline went into service in

November 1994. The project also has a 6-mile, 16-inch proposed lateral from Viosca Knoll to interconnect with Southern in the Main Pass area.

- Main Pass Gathering, jointly owned by Centana Gathering and CNG Main Pass Gathering Corp., is a project that commenced construction in 1995. Phase I is a 30-mile, 20-inch pipeline in the Main Pass area, and Phase II will add 17 miles of 20-inch pipe to the Viosca Knoll area.

A number of these pipelines are profiled in greater detail in Appendix A.

The following table shows the size distribution of pipelines across Eastern Louisiana.

Table V-7

PIPELINE MILEAGE BY DIAMETER
EASTERN LOUISIANA
(Active Pipelines)

Waters	Diameter (Inches)				
	<9	9 - 18	19 - 27	>27	Total
State	17.6%	54.7%	24.9%	2.8%	100%
Federal	53.1%	29.5%	16.5%	0.9%	100%
Total	50.6%	31.3%	17.1%	1.0%	100%

Source: MMS, Segment database and Foster Associates, Inc.

On a mileage basis, relatively small diameter (2- to 8-inch) pipe represents 51 percent of pipeline mileage in Eastern Louisiana while large diameter (over 18 inches) pipe makes up about 18 percent of the mileage. The proportion of large diameter pipeline is less than in other areas although many of the proposed pipelines in Eastern Louisiana are large. About 40 percent of the 258 miles of new pipe will have diameters over 18 inches.

Similar to other regions, state waters have a larger proportion (28 percent) of large diameter pipe (over 18 inches), compared with only 15 percent for the federal waters. Again, a primary reason for this is the larger diameter pipe from federal waters traversing state waters to reach onshore points.

As shown on Table V-8, the largest pipeline owner in federal Eastern Louisiana waters is Southern Natural with 16 percent of the mileage, and the 10 largest owners/operators in the region own 69 percent of the mileage (federal only).

In contrast to the total offshore area, however, only three interstate pipelines are in the top owners/operators in Eastern Louisiana. For the total offshore area, eight of the largest owners are interstate pipelines and two are producers.

Table V-8

TEN LARGEST PIPELINE OWNERS/OPERATORS
IN EASTERN LOUISIANA
FEDERAL WATERS AND ACTIVE PIPELINES ONLY
(MILES)

Owner	<9"	9"-18"	19"-27"	>27"	Total*
Southern Natural	50	176	105	0	332
Chevron	148	88	25	0	262
Texas Eastern	18	55	92	0	166
Exxon Corp.	85	67	0	0	152
Flores & Rucks	100	4	2	0	106
Tennessee Gas	26	35	19	18	98
Viosca Knoll	0	0	95	0	95
Conoco Inc.	51	42	0	0	93
Shell Oil Co.	57	11	0	0	68
Apache Corp.	51	0	0	0	51
Others (52 companies)	501	127	0	0	628
Total *	1,087	605	338	18	2,047

* Totals may not compute due to independent rounding.

Source: MMS, Segment database

Table V-9 shows the distribution of Eastern Louisiana offshore (federal and state) pipeline mileage by type of owner. Interstate pipelines own 36 percent of the offshore mileage (including state waters), lower than their 50 percent ownership across the total Gulf of Mexico. The gas producers own 60 percent of the region's total mileage.

Table V-9

SUMMARY OF EASTERN LOUISIANA PIPELINE OWNERSHIP
BY DIAMETER (Federal and State Waters)
Active Only

Category	<9"	9-18"	19-27"	>27"	Total
Interstate Pipelines	12%	57%	65%	100%	36%
Major Oil Companies	38%	29%	9%	--	30%
Independents	50%	14%	1%	--	30%
Pipeline Affiliates	--	--	25%	--	4%
Total	100%	100%	100%	100%	100%

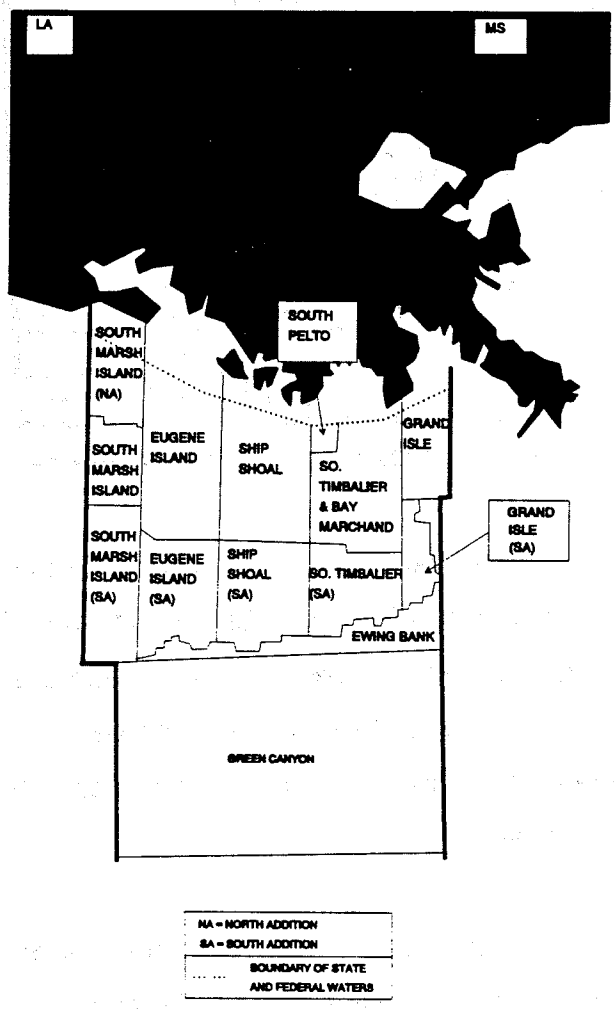
Source: MMS, Segment database and Foster Associates, Inc.

The interstate pipelines own 67 percent of all mileage with diameters over 18 inches. As the new pipelines are built (e.g. Mississippi Canyon), this percentage is expected to fall to about 55 percent.

VI. CENTRAL LOUISIANA REGION

The map below depicts Foster Associates' Central Louisiana region.

CENTRAL LOUISIANA



Central Louisiana produces 39 percent of total federal offshore production and contains 37 percent of the known recoverable reserves. It consists of nine major areas (including additions), and supply characteristics are presented in Table VI-1.

Table VI-1

GAS SUPPLY DATA FOR CENTRAL LOUISIANA
1994

Area	Pro-duction (%)	Remaining Recoverable Reserves (Bcf)	No. of Wells Drilled (1992 - 1994)	
			Explor-ation	Develop-ment
South Marsh Island	24.5	2,289	39	70
Eugene Island	33.5	2,999	49	123
Ship Shoal	16.4	1,474	45	60
South Pelto	1.8	206	7	10
South Timbalier	15.0	1,703	22	37
Bay Marchand	0.1	NA	0	3
Grand Isle	4.2	459	14	59
Ewing Bank	1.7	1,592	5	4
Green Canyon	2.8	NA	10	5
TOTAL	100.0	10,722	191	371

Source: MMS, 1994 Update and Federal Offshore Statistics: 1993 and Foster Associates, Inc.

Eugene Island and South Marsh Island together represented almost 60 percent of the total Central Louisiana production in 1994. Ship Shoal and South Timbalier each have 14 to 16 percent of the production and proven reserves within the region. Ewing Bank is a developing area, with 15 percent of the known reserves but only 2 percent of the region's production. Deepwater drilling activity in the Green Canyon area also characterizes it as a developing area.

One measure of potential development in Central Louisiana is the number of acquired leases and whether they are producing or not. As shown on the following table, 46 percent of the leases here are currently under production, compared to 39 percent across the Gulf.

Table VI-2

STATUS OF ACTIVE CENTRAL LOUISIANA LEASES

Area	Number of Leases		
	Producing	Non-Producing	Total
South Marsh Island	95	83	178
Eugene Island	191	102	293
Ship Shoal	150	109	259
South Pelto	14	8	22
South Timbalier	102	104	206
Bay Marchand	2	2	4
Grand Isle	49	34	83
Ewing Bank	17	54	71
Green Canyon	46	287	333
Total	666	783	1,449

Source: MMS, Lease database

Of the 1,449 outstanding leases, 783 (or 54 percent) are currently non-producing, a lower proportion than other offshore areas; however, both the Ewing Bank and Green Canyon areas have a relatively high proportion of non-producing leases (76 and 85 percent, respectively). Further exploration and development, as well as pipeline construction, will be necessary to bring these leases on line.

Shell owns 10 percent of the Central Louisiana leases, most of which are currently nonproducing. The top 10 producers control 47 percent of the outstanding leases, as shown on Table VI-3.

Table VI-3

SUMMARY OF CENTRAL LOUISIANA FEDERAL OFFSHORE LEASES BY OWNER AND LEASE TYPE

Owner	Proportion of Leases Owned (Percent)		
	Producing	Nonproducing	Total
Shell Offshore	6.1%	14.4%	10.4%
Chevron USA	10.2	3.4	6.7
Texaco Exploration and Prod.	4.7	5.4	5.1
BP Exploration & Oil	0.8	7.4	4.2
Mobil Oil Exploration & Prod.	5.2	3.2	4.2
Exxon	4.7	3.1	3.8
Amoco Production	2.6	4.3	3.5
Zilkha Energy	0.2	6.0	3.2
Vastar Resources	2.1	4.3	3.2
Pennzoil Petroleum	4.5	1.4	2.9
Others (225 companies)	58.9	47.0	52.7
Total	100.0	100.0	100.0

Source: MMS, Lease database

Table VI-4 identifies several new producible wells and/or discoveries in Central Louisiana.

Table VI-4

NEW PRODUCIBLE GAS WELLS
CENTRAL LOUISIANA

Area	Block	Flow (MMcf/d)	Depth (Meters)	Operator
Eugene Island	292	NA	967-2,667	Forest Oil
Eugene Island	240	140 a/	5,333-5,667	Mobil
Eugene Island	208	9.6	3,667	Green Petroleum
Eugene Island	72	12.4 (4 wells)	NA	Noble
Eugene Island	302	NA	2,567	United Meridian
Eugene Island	295	100 (5 wells)	NA	Pogo
Ewing Bank	1003	NA	NA	Tatham
Green Canyon	136	26.7	2,468	Hardy
Ship Shoal	240 & 256	35	NA	Pogo
Ship Shoal	331	NA	4,229	Tatham
South Marsh Island	154	60 b/	NA	LL&E
South Pelto	23	10.1 (3 wells)	NA	Stone Energy
South Timbalier	111	9.1	5,112	Newfield Expl.

a/ Deeper reservoir production capability
b/ Production capability

Source: Trade press articles.

One of the more important developments in Central Louisiana is deepwater drilling in the Green Canyon area. Some of the notable deepwater drilling projects are shown on the following table.

Table VI-5

MAJOR DEEPWATER PROJECTS IN CENTRAL LOUISIANA

Name	Company	Location	Water Depth (Meters)	Startup Date	Peak Production	
					Oil (MBD)	Gas (MMcf/d)
Bullwinkle	Shell	Green Canyon 65	451	1988	49	70
Popeye	Shell	Green Canyon 116	773	1995	NA	120
Fuji	Texaco	Green Canyon 506	1,414	1998	NA	NA

Source: Energy Ventures Analysis, Inc.

Subsalt projects are a new development primarily affecting Central Louisiana and recent projects are summarized on the following table.

Table VI-6

MAJOR SUBSALT PROJECTS IN CENTRAL LOUISIANA

Name	Company	Location	Drilling Depth (Meters)	Production	
				Oil (MBD)	Gas (MMcf/d)
Mahogany 1	Phillips a/	Ship Shoal 349	5,382	7.3	9.9
Teak	Phillips b/	S. Timbalier 260	5,500	4.4	7.6
Mahogany 2	Phillips	Ship Shoal 349	637	4.4	5.3
Mahogany 3	Phillips	Ship Shoal 359	NA	7.2	NA
Mahogany 4	Phillips	Ship Shoal 359	NA	NA	NA

a/ Jointly with Anadarko and Amoco.
b/ Jointly with Anadarko.

Source: Energy Ventures Analysis, Inc.

The following table summarizes the state and federal offshore gas pipeline mileage in Central Louisiana.

Table VI-7

SUMMARY OF PIPELINE MILEAGE STATUS
CENTRAL LOUISIANA

Status	Miles	Percentage
Active		
Federal	4,617	82.2%
State	215	3.8%
Total	4,832	86.0%
Proposed	170	3.0%
Abandoned a/	617	11.0%
TOTAL	5,619	100.0%

a/ Federal only.

Source: Appendix B, Schedules 2 and 3

Central Louisiana contains about one-third of the active gas pipeline mileage in the Gulf of Mexico waters, comparable to its 35 percent share of the active producing leases.

The following table shows size distribution of pipelines across Central Louisiana.

Table VI-8

PIPELINE MILEAGE BY DIAMETER
CENTRAL LOUISIANA
(Active Pipelines)

	Diameter (Inches)				
Waters	<9	9 - 18	19 - 27	>27	Total
State	17.6%	35.1%	32.8%	14.5%	100%
Federal	40.0%	31.3%	22.5%	6.2%	100%
Total	39.0%	31.5%	23.0%	6.5%	100%

Source: MMS, Segment database and Foster Associates, Inc.

On a mileage basis, relatively small diameter (2- to 8-inch) pipe represents 39 percent of offshore pipeline mileage in Central Louisiana while large diameter (over 18

inch) pipe makes up about 29 percent of the mileage, about the same as the Gulf of Mexico as a whole.

Similar to other regions, state water pipelines have a larger proportion (47 percent) of large diameter pipe, compared with only 28 percent for the federal waters.

The largest pipeline owner in federal Central Louisiana waters is Transco, with 14 percent of the mileage, and the 10 largest owners/operators identified on Table VI-9 own about 67 percent of the mileage (federal only). Of the largest owners in this region, five are interstate pipelines and five are gas producers.

Table VI-9

TEN LARGEST PIPELINE OWNERS/OPERATORS
IN CENTRAL LOUISIANA
FEDERAL WATERS AND ACTIVE PIPELINES ONLY
(MILES)

Owner	<8"	9"-18"	19"-27"	>27"	Total*
Transcontinental	89	303	245	0	637
Tennessee Gas	105	201	89	80	474
ANR Pipeline	68	111	178	103	460
Trunkline Gas	12	134	171	49	366
Chevron	158	49	127	0	334
Southern Natural Gas	14	38	120	47	219
Texaco	148	29	0	5	182
Shell Oil	115	38	4	0	156
Pennzoil	66	68	0	0	134
Mobil Oil Exploration	90	18	0	0	108
Others (68 companies)	982	458	105	0	1,545
Total *	1,847	1,447	1,039	284	4,617

* Totals may not compute due to independent rounding of components.

Source: MMS, Segment database

Table VI-10 shows the distribution of Central Louisiana offshore (federal and state) pipeline mileage by type of owner. Interstate pipelines own 54 percent of the offshore mileage (including state waters), about the same as their 50 percent ownership across the total offshore area. The gas producers own 44 percent of the region's total mileage.

Table VI-10

SUMMARY OF CENTRAL LOUISIANA PIPELINE OWNERSHIP
BY DIAMETER (Federal and State Waters)
Active Only

Category	<9"	9-18"	19-27"	>27"	Total
Interstate Pipelines	20%	67%	81%	97%	54%
Major Oil Companies	41%	13%	15%	3%	24%
Independents	37%	19%	4%	–	21%
Pipeline Affiliates	2%	1%	–	–	1%
Total	100%	100%	100%	100%	100%

NOTE: Totals may not compute due to independent rounding of components.

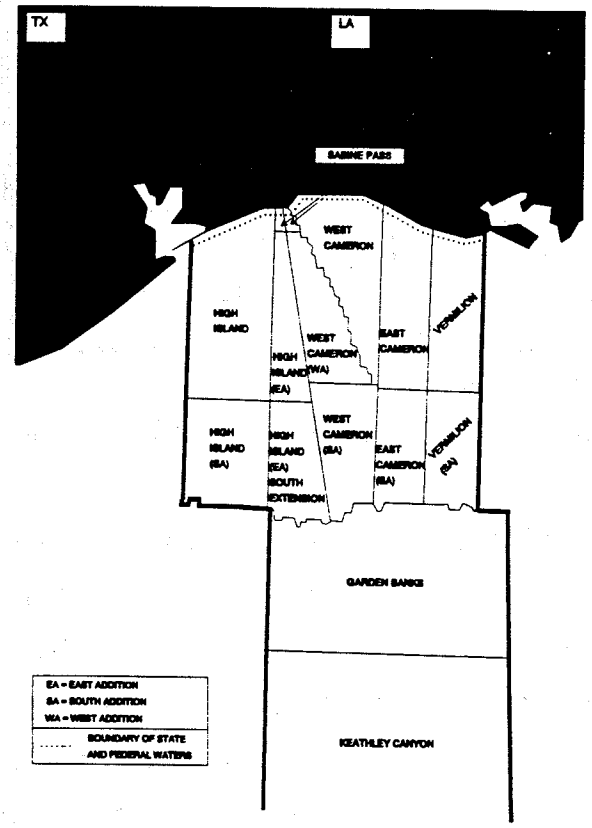
Source: MMS, Segment database and Foster Associates, Inc.

The interstate pipelines own 85 percent of all mileage with diameters over 18 inches.

VII. WESTERN LOUISIANA REGION

The map below depicts Foster Associates' Western Louisiana region.

WESTERN LOUISIANA (INCLUDING HIGH ISLAND)



Although 35 percent of the offshore Gulf of Mexico production comes from Western Louisiana, this region holds only 30 percent of the known reserves. The region consists of seven major producing areas (including additions), and the High Island area of offshore Texas. The market orientation of High Island production is more closely associated with the fields of the Western Louisiana region rather than the offshore Texas fields discussed in Section VIII. Supply characteristics of each area are presented in Table VII-1.

Table VII-1

GAS SUPPLY DATA FOR WESTERN LOUISIANA
1994

Area	Pro-duction (%)	Proven Remaining Reserves (Bcf)	No. of Wells Drilled (1992 - 1994)	
			Explor-ation	Develop-ment
Sabine Pass	0.7	a/	0	0
West Cameron	26.8	2,822	40	56
East Cameron	22.2	1,276	45	32
Vermilion	18.4	1,998	49	53
High Island	30.3	1,830	49	35
Garden Banks	1.6	664	18	18
Keathley Canyon	NA	NA	0	0
TOTAL	100.0	8,591	201	194

a/ Included with West Cameron.

Source: MMS, 1994 Update and Federal Offshore Statistics: 1993 and Foster Associates, Inc.

The majority of Western Louisiana's production comes from four producing areas -- West Cameron, East Cameron, Vermilion and High Island -- making up 98 percent of the total production and 92 percent of the remaining recoverable reserves. The Garden Banks deepwater area represents almost 2 percent of the region's production, but holds 8 percent of the reserves, indicating further development potential.[1] Little exploration activity is evident in the Keathley Canyon area located south of Garden Banks.

In general, as a gas supply source Western Louisiana is considered more mature than other offshore Louisiana regions; however, similar to the other regions, the majority of the outstanding leases are non-producing, as shown on Table VII-2.

[1] Chevron recently has reported that Garden Banks Block 191 production has reached 220 MMcf/d.

Table VII-2

STATUS OF ACTIVE WESTERN LOUISIANA LEASES

Area	Number of Leases		
	Producing	Non-Producing	Total
Sabine Pass	7	6	13
West Cameron	174	227	401
East Cameron	96	152	248
Vermilion	132	159	291
High Island	161	166	327
Garden Banks	27	153	180
Keathley Canyon	0	18	18
Total	597	881	1,478

Source: MMS, Lease database

Of the 1,478 outstanding leases, 881 (or 60 percent) are currently non-producing. Further exploration and development, as well as pipeline construction, will be necessary to bring these on line.

The top 10 producers in this region hold 37 percent of the outstanding leases, as shown on Table VII-3.

Table VII-3

SUMMARY OF WESTERN LOUISIANA FEDERAL OFFSHORE LEASES BY OWNER AND LEASE TYPE

Owner	Proportion of Leases Owned (Percent)		
	Producing	Nonproducing	Total
Shell Offshore	5.8%	9.0%	7.7%
Zilkha Energy	0.4	6.9	4.2
Chevron USA	5.8	2.6	3.9
Pennzoil Petroleum	5.8	2.1	3.6
Union Oil of California	5.3	1.7	3.2
Samedan Oil	3.9	2.7	3.2
Amerada Hess	2.8	3.4	3.2
Amoco Production	3.1	2.7	2.8
Texaco Exploration and Prod.	2.4	3.1	2.8
Kerr-McGee	1.2	3.4	2.5
Others (221 companies)	63.5	62.4	62.8
Total	100.0	100.0	100.0

Source: MMS, Lease database

Table VII-4 identifies several new producible wells and/or discoveries in Western Louisiana.

Table VII-4

NEW PRODUCIBLE GAS WELLS
WESTERN LOUISIANA

Area	Block	Flow (MMcf/d)	Depth (Meters)	Operator
Vermilion	102	NA	NA	Forest Oil
Vermilion	410	5 a/	120	Ashland
High Island	93	12	NA	General Atlantic
Vermilion	160	26 b/	30	Freeport McMoRan
West Cameron	408	7.3 b/	NA	American Exploration
High Island	A-576	NA	97	Oryx
Vermilion	115	10 b/	NA	American Exploration
High Island	A-376	2.8 b/	NA	Anadarko
Garden Banks	388	120 b/	NA	Enserch
East Cameron	303	NA	62	Seagull
East Cameron	281	22.8	NA	Chevron
Garden Banks	240	20-30	273	Hardy Oil & Gas
High Island	A-451	10.3	NA	Pogo
High Island	23-L	5	NA	Global Natural Gas
Garden Banks	260	24.5	567	Oryx

a/ One zone
b/ Production capability

Source: Trade press articles.

Deepwater and subsalt activity is not as prevalent in Western Louisiana as compared with more eastern areas although some deepwater drilling is being conducted in the Garden Banks area.[1] One example is Shell's Auger project in Garden Banks Block 426 where Shell installed a tension leg platform in 953 meters of water. Producing wells came online in 1994, representing one of the first producing

[1] While this is true, much of the Garden Banks drilling is in relatively shallow water.

facilities at these depths. Total gas production is expected to reach 125 MMcf/d. In addition, a number of subsalt exploratory projects have been developed in the region (e.g., Anadarko is active in Vermilion Block 349) although these have been unsuccessful thus far.

Table VII-5 summarizes the state and federal offshore gas pipeline mileage in Western Louisiana.

Table VII-5

SUMMARY OF PIPELINE MILEAGE STATUS
WESTERN LOUISIANA

Status	Miles	Percentage
Active		
Federal	5,094	84.5%
State	177	2.9
Total	5,271	87.4
Proposed	231	3.8
Abandoned a/	529	8.8
TOTAL	6,031	100.0%

a/ Federal only.

Source: Appendix B, Schedules 2 and 3

Western Louisiana contains 36 percent of the active gas pipeline mileage in the Gulf of Mexico waters, compared with only 31 percent of the active producing leases. About 30 percent of the new pipeline developments are in this region, primarily in the Garden Banks area.

- Shell's Auger Line is a new 36-mile, 12-inch line from Garden Banks Block 426 to interconnect with ANR.

- EP Operating Pipeline (a Hunt/Placid interest) has proposed a 54-mile, 12-inch line from Garden Banks Block 388 to a proposed platform in Eugene Island Block 315 where it will connect with Tennessee.

- Stingray Pipeline, owned by Natural Gas Pipeline and Leviathan, is proposing to construct a 16-mile, 20-inch diameter lateral from Garden Banks Block 72 to Vermilion Block 311.

A number of these proposed pipelines, as well as a number of existing ones, are profiled in greater detail in Appendix A.

The following table shows size distribution of pipelines across Western Louisiana.

Table VII-6

PIPELINE MILEAGE BY DIAMETER
WESTERN LOUISIANA
(Active Pipelines)

Waters	Diameter (Inches)				
	<9	9 - 18	19 - 27	>27	Total
State	11.3%	55.0%	21.7%	12.0%	100%
Federal	36.0%	35.3%	12.2%	16.5%	100%
Total	35.1%	36.0%	12.5%	16.4%	100%

Source: MMS, Segment database and Foster Associates, Inc.

The pipeline size distribution of the Western Louisiana offshore systems is about the same as for the Gulf of Mexico as a whole. Within this region, about 35 percent of the lines have small diameters of 2 to 8 inches, compared with 40 percent of lines throughout the total Gulf. Large diameter (over 18 inches) pipe represents 29 percent of the Western Louisiana pipe, about the same percentage as the total Gulf. The majority of the planned new lines are small diameter.

Similar to other regions, state waters have a higher proportion (34 percent) of large diameter pipe (over 18 inches) compared with only 28 percent for the federal waters.

Ten interstate pipelines are the largest pipeline owners in Western Louisiana, owning 59 percent of the total mileage in federal waters.

Table VII-7

TEN LARGEST PIPELINE OWNERS/OPERATORS
IN WESTERN LOUISIANA
FEDERAL WATERS AND ACTIVE PIPELINES ONLY
(MILES)

Owner	<9"	9"-18"	19"-27"	>27"	Total*
Tennessee Gas	89	245	79	133	545
Transcontinental	60	244	135	0	439
Texas Eastern	65	111	138	90	404
Stingray Pipeline	1	90	130	97	318
Columbia Gulf	31	110	15	135	291
Southern Natural	67	85	38	95	285
High Island Offshore	0	0	0	204	204
ANR Pipeline	44	75	47	38	204
Natural Gas Pipeline	10	106	22	24	162
Koch Gateway	57	92	9	0	158
Others (82 companies)	1,409	642	6	25	2,083
Total *	1,833	1,800	619	841	5,094

* Totals may not compute due to independent rounding of components.

Source: MMS, Segment database

Table VII-8 shows the distribution of Western Louisiana offshore (federal and state) pipeline mileage by type of owner. Interstate pipelines own 61 percent of the region's offshore mileage (including state waters), higher than their 50 percent

ownership across the total offshore area. Gas producers own 33 percent of the region's total mileage.

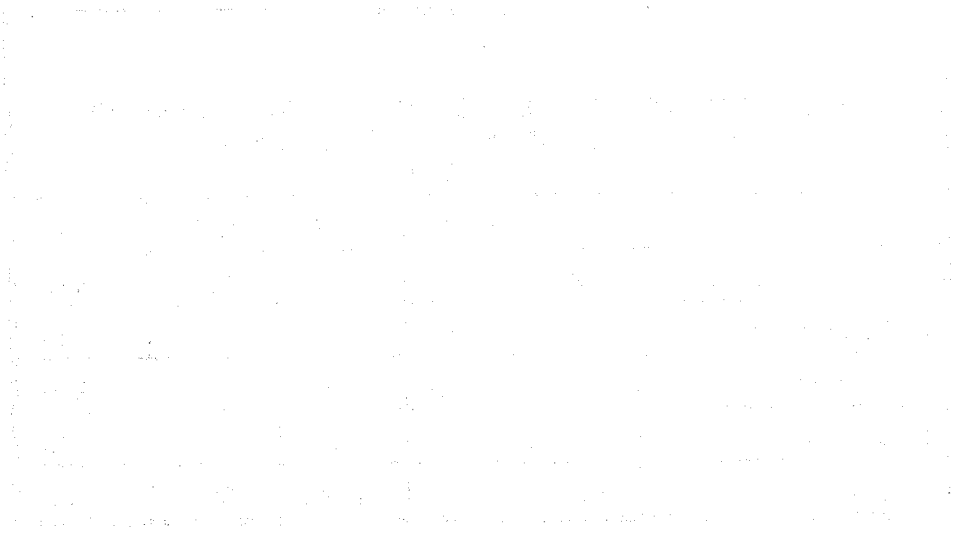
Table VII-8

SUMMARY OF WESTERN LOUISIANA PIPELINE OWNERSHIP BY DIAMETER (Federal and State Waters) Active Only

Category	<9"	9-18"	19-27"	>27"	Total
Interstate Pipelines	19%	72%	96%	100%	61%
Major Oil Companies	21%	13%	1%	--	12%
Independents	50%	10%	1%	--	21%
Pipeline Affiliates	10%	5%	2%	--	6%
Total	100%	100%	100%	100%	100%

Source: MMS, Segment database and Foster Associates, Inc.

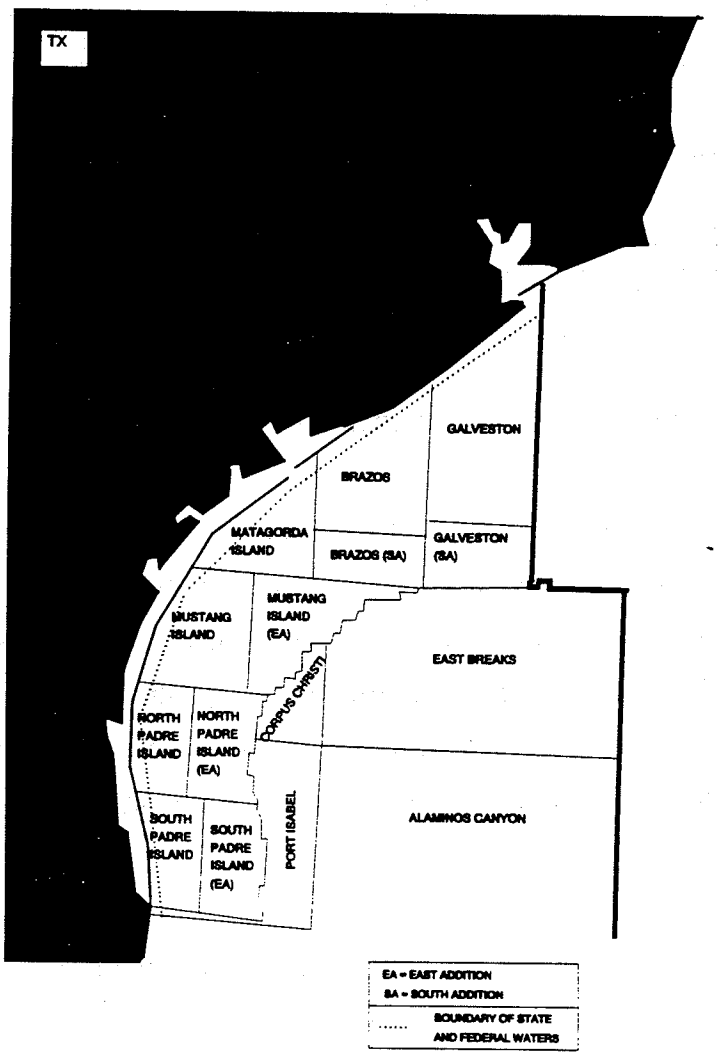
The interstate pipelines own 98 percent of all mileage with diameters above 18 inches.



VIII. TEXAS REGION

The map below depicts Foster Associates' offshore Texas region.

TEXAS



Offshore Texas accounts for 16 percent of the Gulf of Mexico's production and has 15 percent of the remaining recoverable reserves. It consists of ten major producing areas (including additions) and supply characteristics of each are presented in Table VIII-1.

Table VIII-1

GAS SUPPLY DATA FOR OFFSHORE TEXAS
1994

Area	Pro-duction (%)	Proven Remaining Reserves (Bcf)	No. of Wells Drilled (1992 - 1994)	
			Explor-ation	Develop-ment
Galveston	8.8	318	18	10
Brazos	26.7	893	17	15
Matagorda Island	50.0	1,739	15	22
Mustang Island	11.2	884	19	15
North Padre Island	2.4	187	2	4
East Breaks	0.9	327	2	3
TOTAL	100.0	4,348	73	69

Source: MMS, 1994 Update and Federal Offshore Statistics: 1993 and Foster Associates, Inc.

One-half of the offshore Texas production in 1994 came from the Matagorda Island area and this area contains an estimated 40 percent of the region's discovered reserves. Recent drilling activity in the region has been equally dispersed across four areas -- Matagorda Island, Galveston, Brazos and Mustang Island. The deepwater area of East Breaks represents only 1 percent of the current production, but 8 percent of the discovered reserves, indicating future development potential.

One measure of potential development in offshore Texas is the number of acquired leases and whether they are producing or not. As shown on the following table, only about one-third of the leases acquired in this area are currently under production, slightly less than the proportion across the total Gulf of Mexico.

Table VIII-2

STATUS OF ACTIVE OFFSHORE TEXAS LEASES

Area	Number of Leases		
	Producing	Non-Producing	Total
Galveston	40	84	124
Brazos	57	71	128
Matagorda Island	61	30	91
Mustang Island	38	54	92
North Padre Island	10	29	39
South Padre Island	1	15	16
East Breaks	15	85	100
Port Isabel	3	37	40
Alaminos Canyon	1	73	74
Total	226	478	704

Source: MMS, Lease database

Of the 704 outstanding leases, 478 (or 68 percent) are currently non-producing. Further exploration and development, as well as pipeline construction, will be necessary to bring these on line.

The following table shows the proportion of lease ownership held by the top 10 producers in offshore Texas. These 10 companies own 36 percent of the producing leases, and 65 percent of the non-producing leases.

Table VIII-3

SUMMARY OF TEXAS FEDERAL OFFSHORE LEASES BY OWNER AND LEASE TYPE

Owner	Proportion of Leases Owned (Percent)		
	Producing	Nonproducing	Total
Shell Offshore	5.0%	12.1%	9.8%
Enron Oil & Gas	4.7	9.9	8.2
Mobil Producing Texas & New Mexico	1.8	10.3	7.6
Amerada Hess	3.6	6.2	5.3
BP Exploration	2.1	6.2	4.8
Texaco Exploration and Prod.	3.2	5.5	4.8
Seagull Energy E&P	2.9	5.1	4.4
Exxon	4.9	3.8	4.1
Amoco Production	2.9	3.4	3.2
Vastar Resources	4.5	2.5	3.2
Others (128 companies)	64.4	35.0	44.6
Total	100.0	100.0	100.0

Source: MMS, Lease database.

Table VIII-4 identifies several new producible wells and/or discoveries in areas of offshore Texas.[1]

[1] In addition, Seagull plans to install five new platforms in the Gulf, increasing production by 35 to 40 MMcf/d.

Table VIII-4

NEW PRODUCIBLE GAS WELLS
OFFSHORE TEXAS

Area	Block	Flow (MMcf/d)	Water Depth (Meters)	Operator
Galveston	357	NA	29	Seagull
Mustang Island	783	22.0	NA	Global
Galveston	362	8.2	NA	Seagull
Brazos	375	6.6	NA	Seneca Resources
Galveston	283	8.2	22	Seagull
Galveston	420	18.0	22	Seagull
Galveston	273	4.6	21	Seagull

Source: Trade press articles.

Deepwater and subsalt drilling in offshore Texas is not as active as other offshore regions, such as Central and Eastern Louisiana.

The following table summarizes gas pipeline mileage in state and federal offshore Texas areas.

Table VIII-5

SUMMARY OF PIPELINE MILEAGE STATUS
OFFSHORE TEXAS

Status	Miles	Percentage
Active		
Federal	1,511	61.0%
State	772	31.2
Total	2,283	92.2
Proposed	51	2.1
Abandoned a/	142	5.7
TOTAL	2,476	100.0%

a/ Federal only.

Source: Appendix B, Schedules 2 and 3

Offshore Texas contains 15 percent of the active gas pipeline mileage in the Gulf of Mexico waters, compared with 12 percent of the active producing leases. Offshore Texas state waters have many more miles of pipe than any other region, representing 31 percent of the region's offshore mileage. Most of the pipelines are owned by independent oil companies or intrastate pipelines such as Valero and Tejas Power.[1] Very few new pipelines are being proposed in this area and those that are proposed are generally small diameter gathering lines, 4 to 6 inches in diameter.

The following table shows the region's mileage distribution by pipeline size.

Table VIII-6

PIPELINE MILEAGE BY DIAMETER
OFFSHORE TEXAS
(Active Pipelines)

Waters	Diameter (Inches)				
	<9"	9 - 18"	19 - 27"	>27"	Total
State	36.8%	28.4%	33.4%	1.3%	100%
Federal	43.8%	33.7%	17.5%	4.9%	100%
Total	41.4%	32.0%	22.9%	3.7%	100%

Source: MMS, Segment database and Foster Associates, Inc.

Relatively small diameter (2- to 8-inch) pipe represents 41 percent of pipeline mileage in offshore Texas waters while large diameter (over 18 inches) pipe makes up about 27 percent of the mileage. The proportion of large diameter pipeline is about the same as the Gulf of Mexico as a whole. Similar to other areas, the state waters have a disproportionate share of the large diameter lines.

[1] Tejas Power recently purchased the offshore Texas pipeline facilities of Seagull.

The largest pipeline owner in federal offshore Texas waters is Transco, with 32 percent of the total mileage. The 10 largest owners/operators in this region own 75 percent of the mileage (federal only).

In contrast to the total offshore area, however, only three interstate pipelines are in the top owners/operators. For the total offshore area, eight of the largest facility owners are interstate pipelines.

Table VIII-7

TEN LARGEST PIPELINE OWNERS/OPERATORS
IN THE TEXAS REGION
FEDERAL WATERS AND ACTIVE PIPELINES ONLY
(MILES)

Owner	<9"	9"-18"	19"-27"	>27"	Total*
Transcontinental	18	191	171	75	454
Enron	42	78	72	0	192
Tejas Power	102	72	0	0	174
Walter Oil and Gas	105	0	0	0	105
Apache	36	14	0	0	51
Union Oil	29	16	0	0	45
Blue Dolphin Pipeline	14	0	23	0	37
OXY USA	10	23	0	0	33
Zapata Exploration	0	31	0	0	31
Southern Natural	6	20	0	0	26
Others (45 companies)	300	65	0	0	364
Total *	662	510	265	75	1,511

* Totals may not compute due to independent rounding of components.

Source: MMS, Segment database

As stated above, pipeline mileage in Texas state waters represents a significant proportion (31 percent) of total regional mileage. Certain pipelines in state waters are as large as or larger than the top 10 owners identified in federal waters. These include

Tejas Power with a state water total of about 142 miles, and Houston Pipe Line with just over 100 miles.

Table VIII-8 shows the distribution of offshore Texas (federal and state) pipeline mileage by type of owner. Interstate pipelines own 35 percent of the offshore mileage (including state waters), lower than their 50 percent ownership share across the Gulf. The gas producers own 40 percent of the region's total mileage and intrastate pipelines own 18 percent.

Table VIII-8

SUMMARY OF OFFSHORE TEXAS PIPELINE OWNERSHIP
BY DIAMETER (Federal and State Waters)
Active Only

Category	<9"	9 - 18"	19-27"	>27"	Total
Interstate Pipelines	11%	39%	66%	100%	35%
Intrastate Pipelines	16%	13%	30%	–	18%
Major Oil Companies	13%	7%	–	–	8%
Independents	55%	27%	4%	–	32%
Pipeline Affiliates	5%	15%	0%	–	7%
Total	100%	100%	100%	100%	100%

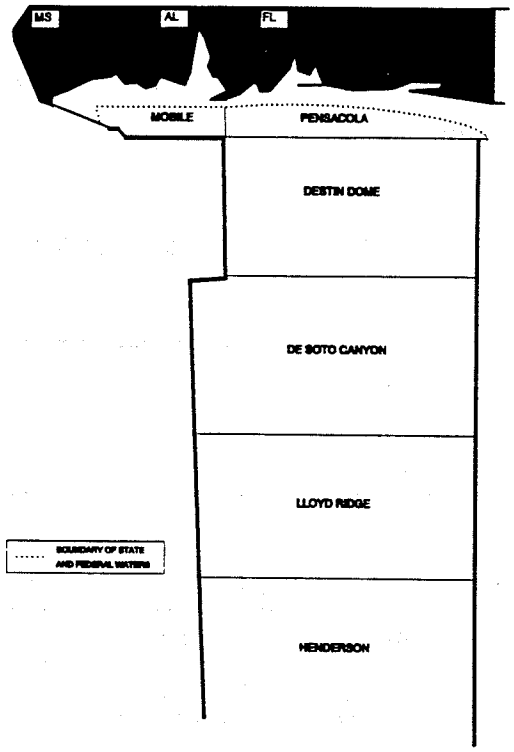
Source: MMS, Segment database and Foster Associates, Inc.

The interstate pipelines own 70 percent of all mileage with diameters above 18 inches and intrastate pipelines own 30 percent.

IX. EASTERN GULF REGION

The offshore Mississippi/Alabama/Florida areas, including federal and state waters, represent the Eastern Gulf region as shown on the map below.

EASTERN GULF



Commercial discoveries to date have been concentrated in the area offshore from Mobile Bay.

In 1994, only about 2 percent of the Gulf of Mexico production came from this region; however, production is increasing rapidly. For example, Mobil Oil reported an increase in its level of production in 1994 from 270 MMcf/d to more than 350 MMcf/d from two fields in the Mobile Bay area.

This region had 1.5 Tcf of discovered reserves at the end of 1994; however, the potential resource base in the Eastern Gulf is large. The Potential Gas Committee estimated 22.6 Tcf of potential resources. However, over half of this estimate is classified in the speculative category because of lack of drilling estimates. One promising area is the Norphlet trend that stretches 80 miles from the Destin Dome area (offshore Florida) to Mobile Block 861 (offshore Alabama). Chevron estimates that this trend alone holds 7 to 8 Tcf of recoverable gas.

Currently there are 170 outstanding leases in the Eastern Gulf region, of which 52 are producing and 118 are non-producing.

Table IX-1 identifies several new producible wells and/or discoveries in the Eastern Gulf region.

Table IX-1

NEW PRODUCIBLE GAS WELLS
EASTERN GULF

Area	Block	Flow (MMcf/d)	Operator
Mobile Bay	OCS 869	59.8	Mobil
Mobile Bay (Norphlet)	916	32.5	Unocal

Source: Trade press articles

Chevron is the largest lease holder in the Eastern Gulf region, with 27 percent of the total. As shown on Table IX-2, the top 10 producers hold 89 percent of the total.

Table IX-2

SUMMARY OF EASTERN GULF FEDERAL OFFSHORE LEASES BY OWNER AND LEASE TYPE

Owner	Proportion of Leases Owned (Percent)		
	Producing	Nonproducing	Total
Chevron USA	25.0%	28.4%	27.4%
Murphy Exploration & Prod.	10.2	16.1	14.2
Conoco	6.0	15.5	12.6
Mobil Oil Exploration & Prod.	3.4	11.0	8.6
Union Oil of California	17.5	3.6	8.0
Amoco Production	0.0	6.4	4.4
Exxon	12.2	0.0	3.8
Texaco Exploration and Prod.	1.5	4.2	3.4
Marathon Oil	0.0	4.7	3.2
Anadarko Petroleum	0.0	4.4	3.0
Others (23 companies)	24.2	5.7	11.4
Total	100.0	100.0	100.0

Source: MMS, Lease database

The following table summarizes the state and federal offshore gas pipeline mileage in the region.

Table IX-3

SUMMARY OF PIPELINE MILEAGE STATUS EASTERN GULF

Status	Miles	Percentage
Active		
Federal	117	47.4%
State	61	24.7
Total	178	72.1
Proposed	65	26.3
Abandoned a/	4	1.6
TOTAL	247	100.0%

a/ Federal only.

Source: Appendix B, Schedules 2 and 3

This Eastern Gulf contains 1 percent of the active gas pipeline mileage in the Gulf of Mexico waters, compared with 3 percent of the active producing leases. New pipelines (e.g. Dauphin Island Gathering System) for this area total about 8 percent of the offshore total. Project profiles are presented in Appendix A.

The following table shows the region's mileage distribution by pipeline size.

Table IX-4

PIPELINE MILEAGE BY DIAMETER
EASTERN GULF REGION
(Active Pipelines)

Waters	Diameter (Inches)				
	<9"	9 - 18"	19 - 27"	>27"	Total
State	29.5%	44.7%	25.8%	--	100%
Federal	63.0%	18.1%	18.9%	--	100%
Total	51.5%	27.2%	21.3%	--	100%

Source: MMS, Segment database and Foster Associates, Inc.

On a mileage basis, relatively small diameter (2- to 8-inch) pipe represents 52 percent of pipeline mileage in these waters while large diameter (over 18 inches) pipe makes up about 21 percent of the mileage. The Eastern Gulf region contains no pipelines over 27 inches in diameter.

The largest pipeline owner in federal Eastern Gulf waters is Chevron. Only 10 pipelines are operating in these waters, as shown on Table IX-5.

In contrast to the total offshore area, however, all Eastern Gulf owners/operators are producers. For the total offshore area, only two producers are among the 10 largest pipeline facility owners.

Table IX-5

PIPELINES IN EASTERN GULF REGION
FEDERAL WATERS AND ACTIVE PIPELINES ONLY
(MILES)

Owner	<9"	9"-18"	19"-27"	>27"	Total*
Chevron	17	19	0	0	36
Dauphin Island a/	3	1	22	0	26
Apache	18	0	0	0	18
Murphy Exploration	15	0	0	0	15
Union Oil	11	1	0	0	12
OEDC	4	0	0	0	4
Offshore Energy	2	0	0	0	2
Mobil Oil Exploration	1	b/	b/	0	2
Santa Fe Energy	1	0	0	0	1
Exxon	b/	0	0	0	b/
Others (0 companies)	0	0	0	0	0
Total *	73	21	22	0	117

* May not compute due to independent rounding.

a/ Excluding segments in the Eastern Louisiana region and newly constructed lines.
b/ Less than one mile.

Source: MMS, Segment database

Table IX-5 only lists pipelines in federal waters. In state waters, the largest pipelines are owned by Exxon (24 miles of 4- to 20-inch diameter pipe) and Mobil (9 miles of 8- to 20-inch diameter pipe).

Table IX-6 shows the distribution of the Eastern Gulf offshore (federal and state) pipeline mileage by type of owner. Interstate pipelines own only 6 percent of the offshore mileage (solely in state waters), compared with 50 percent ownership of facilities across the total offshore area. Major producers own 51 percent of the mileage and independents own 18 percent.

Table IX-6

SUMMARY OF EASTERN GULF PIPELINE OWNERSHIP
BY DIAMETER (Federal and State Waters)
Active Only

Category	<9"	9 - 18"	19 - 27"	>27"	Total
Interstate Pipelines	0	24%	0	–	6%
Major Oil Companies	65%	42	30%	–	51
Independents	27	14	–	–	18
Pipeline Affiliates	8	20	70	–	25
Total	100	100	100	100	100

Source: MMS, Segment database and Foster Associates, Inc.

APPENDIX A

OFFSHORE PROJECT PROFILES AND MAPS

ANR Pipeline Co.
Chandeleur Pipe Line Co.
Columbia Gulf Transmission Company
Dauphin Island Gathering System
EP Operating Company
High Island Offshore System (HIOS) and UT Offshore System (UTOS)
Leviathan Gas Pipeline
Main Pass Gathering Company
Matagorda Offshore Pipeline System (MOPS)
Sea Robin Pipeline
Shell's Auger Line
Shell's Mississippi Canyon Gathering System
Southern Natural Gas
Stingray Pipeline Co.
Superior Offshore Pipeline Company
Tejas Power Corp.
Tennessee Gas Pipeline
TOMCAT
Transcontinental Gas Pipe Line
Trunkline Gas Co.
Venice Gathering System
Viosca Knoll Gathering System