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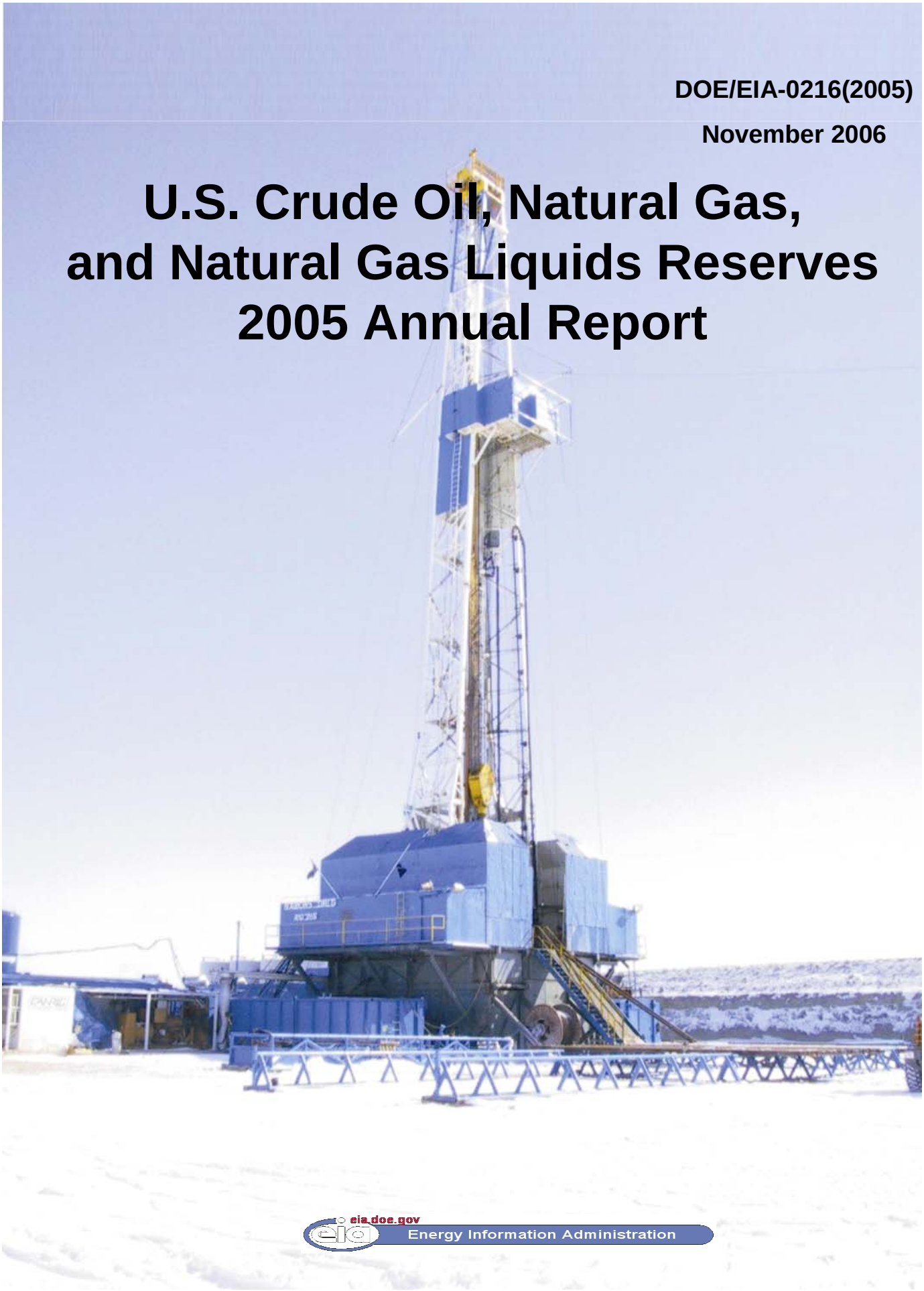
U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 2005 Annual Report



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U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves

2005 Annual Report

November 2006

Energy Information Administration
Office of Oil and Gas
U.S. Department of Energy
Washington, DC 20585

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Preface

The *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 2005 Annual Report* is the 29th prepared by the Energy Information Administration (EIA) to fulfill its responsibility to gather and report annual proved reserves estimates. The EIA annual reserves report series is the only source of comprehensive domestic proved reserves estimates. This publication is used by the Congress, Federal and State agencies, industry, and other interested parties to obtain accurate estimates of the Nation's proved reserves of crude oil, natural gas, and natural gas liquids. These data are essential to the development, implementation, and evaluation of energy policy and legislation.

This report presents estimates of proved reserves of crude oil, natural gas, and natural gas liquids as of December 31, 2005, as well as production volumes for the United States and producing States and State subdivisions for the year 2005. Estimates are presented for the following four categories of natural gas: total gas (wet after lease separation), nonassociated gas and associated–dissolved gas (which are the two major types of wet natural gas), and total dry gas (wet gas adjusted for the removal of liquids at natural gas processing plants). In addition, reserve estimates for two types of natural gas liquids, lease condensate and natural gas plant liquids, are presented. The estimates are based upon data obtained from two annual EIA surveys: Form EIA–23, "Annual Survey of Domestic Oil and Gas Reserves" and Form EIA–64A, "Annual Report of the Origin of Natural Gas Liquids Production." Also included is information on crude oil, natural gas, and lease condensate reserves in nonproducing reservoirs. A discussion of notable oil and gas exploration and development activities during 2005 is provided.

The appendices contain data by operator production size class for crude oil and natural gas reserves and production; the top 100 U.S. fields ranked within an oil or gas proved reserves group for 2005; Table 1 converted to metric units; historical State data; a summary of survey operations; a discussion of statistical considerations; methods used to develop the estimates provided in this report; maps of selected State subdivisions; and examples of the survey forms. A glossary of the terms used in this report and in survey Forms EIA–23 and EIA–64A is provided to assist readers in more fully understanding the data.

This annual reserves report was prepared by the Reserves and Production Division (located in Dallas, Texas), Office of Oil and Gas, Energy Information Administration. General information regarding preparation of the report may be obtained from Kenneth A. Vagts, Director, Office of Oil and Gas and John H. Wood, Director, Reserves and Production Division (214·720·6160).

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COVER PHOTO:

Rig drilling in the Elm Coulee Field in Richland County, Montana amid a carpet of Montana snow. Photo by Tim Lechner, Senior Operations Engineer, Headington Oil Company, Sidney, Montana.

Headington Oil Company, headquartered in Dallas, TX, is one of the two largest lease holders in the Elm Coulee Field.

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Executive Summary

Reserves additions replaced 164 percent of 2005 dry gas production as U.S. gas reserves increased for the seventh year in a row. Proved reserves of natural gas increased by 6 percent in 2005, the largest annual increase in natural gas proved reserves since 1970.

Reserves additions of crude oil replaced 122 percent of the 2005 production. Crude oil proved reserves increased for the first time in 3 years, up 2 percent from 2004.

As of December 31, 2005 proved reserves were:

Crude Oil (million barrels)	
2004	21,371
2005	21,757
Increase	+1.8%
Dry Natural Gas (billion cubic feet)	
2004	192,513
2005	204,385
Increase	+6.2%
Natural Gas Liquids (million barrels)	
2004	7,928
2005	8,165
Increase	+3.0%

Proved reserves are the estimated quantities which geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions. Petroleum engineering and geological judgment are required in estimating proved reserves; therefore the results are not precise measurements.

Natural Gas

Gas reserves additions onshore in the lower 48 States were large enough to overcome a 10 percent drop in gas reserves reported for the Gulf of Mexico Federal Offshore. The majority of natural gas reserves additions in 2005 resulted from extensions of existing gas fields rather than new field or reservoir discoveries. Texas and Colorado led the nation in 2005 natural gas reserves additions with notable reserves increases in the Newark East Field (Barnett Shale, TX) and Ignacio-Blanco Field (tight sands and coalbeds, CO).

Total U.S. natural gas production declined 4 percent in 2005 because, in August and September of 2005, Hurricanes Katrina and Rita wreaked havoc along the Gulf Coast. Beyond devastating much of coastal Alabama, Louisiana, Mississippi, and the flooding of New Orleans, these storms destroyed 113 offshore platforms and seriously damaged offshore pipelines and coastal oil and natural gas processing facilities, impacting the Nation's oil and gas production. At its nadir, natural gas production in the Gulf of Mexico (which accounted for 20 percent of U.S. dry gas production in 2004) was cut by 80 percent. Gulf of Mexico production slowly returned and reached roughly 80 percent of 2005's pre-hurricane production rate (10.2 Bcf/day gross withdrawal in June 2005) in September 2006. For several years before Hurricane Katrina, gas production from the Gulf had been declining about 10 percent per year.

Total discoveries of dry natural gas reserves attributed to the drilling of exploratory wells, which include field extensions, new field discoveries, and new reservoir discoveries in old fields, were 23,200 billion cubic feet in 2005. This was 45 percent more than the prior 10-year average and 15 percent more than in 2004.

The majority of natural gas total discoveries in 2005 were from extensions to existing gas fields. Field extensions were 21,050 billion cubic feet, 16 percent more than in 2004 and 74 percent more than the prior 10-year average (12,101 billion cubic feet).

New field discoveries were 942 billion cubic feet, 24 percent more than the volume discovered in 2004 and 46 percent less than the prior 10-year average (1,731 billion cubic feet).

New reservoir discoveries in old fields were 1,208 billion cubic feet, up slightly from 2004 and 45 percent less than the prior 10-year average (2,198 billion cubic feet).

Natural gas net revisions and adjustments were 4,586 billion cubic feet, which is seven times the net revisions and adjustments of 2004, but 7 percent less that the prior 10-year average (4,908 billion cubic feet). The net of sales and acquisitions of dry natural gas proved reserves was 2,544 billion cubic feet.

Coalbed natural gas reserves increased 8 percent in 2005 and accounted for 10 percent of U.S. dry natural gas reserves. Coalbed natural gas production increased less than 1 percent from 2004 and

accounted for 9 percent of U.S. dry natural gas production.

Other 2005 natural gas events of note:

- Natural gas prices at the wellhead rose 38 percent in 2005 to an average of $7.51 per thousand cubic feet, as compared to $5.46 per thousand cubic feet in 2004.
- Exploratory and developmental gas completions were up 27 percent from 2004.

Crude Oil

Reserves additions of crude oil replaced 122 percent of the 2005 production. Crude oil proved reserves increased for the first time in 3 years, increasing by 2 percent from 2004. Two of the four largest U.S. oil-producing areas, Texas and California, reported increases in proved crude oil reserves in 2005 while Alaska and the Gulf of Mexico Federal Offshore reported declines. Several significant deepwater discoveries that have been made in recent years in the Gulf are not yet booked as proved reserves. Texas reported the largest increase in crude oil reserves, a majority from the Permian Basin in west Texas. Wyoming and Montana had the second and third largest increases.

U.S. crude oil production declined in 2005 due to lower production in the Gulf of Mexico and Alaska. The Rocky Mountain States generally increased crude oil production in 2005 with the largest increase occurring in Montana (up 36 percent) from development of the Bakken formation of the Williston Basin.

Total discoveries of crude oil were 1,051 million barrels in 2005, 7 percent less than the prior 10-year average and 34 percent more than 2004's discoveries of 782 million barrels.

The majority of crude oil total discoveries in 2005 came from extensions to fields in Texas, California, Montana, and Wyoming.

New field discoveries accounted for 205 million barrels of crude oil reserves additions. Almost all of these discoveries (201 of 205 million) were in the Gulf of Mexico Federal Offshore. This was 6 times greater than the new field discoveries of 2004 and only 49 percent of the prior 10-year average (419 million barrels).

Operators discovered 805 million barrels in extensions in 2005, 30 percent more than in 2004 and 53 percent more than the prior 10-year average (527 million barrels).

New reservoir discoveries in old fields were 41 million barrels, 69 percent less than 2004 and only 23 percent of the prior 10-year average (180 million barrels).

Reserves additions are the sum of total discoveries, revisions, adjustments, sales, and acquisitions. In 2005, reserve additions were 2,119 million barrels, 63 percent more than the volume of reserves additions in 2004 and 13 percent more than the prior 10-year average (1,875 million barrels).

Crude oil net revisions and adjustments were 790 million barrels, 60 percent more than the net revisions and adjustments of 2004 and almost equal to the prior 10-year average (795 million barrels). The net of sales and acquisitions of crude oil proved reserves was 278 million barrels.

Other 2005 crude oil events of note:

- The annual average domestic first purchase price for crude oil increased 37 percent from $36.77 per barrel in 2004 to $50.28 per barrel.
- Exploratory and developmental oil completions were up 25 percent from 2004.

Natural Gas Liquids

Natural gas liquids reserves are the sum of lease condensate reserves and natural gas plant liquids reserves. Natural gas liquids proved reserves increased 3 percent in 2005. Operators replaced 130 percent of U.S. natural gas liquids production with reserves additions.

Total proved reserves of liquid hydrocarbons (crude oil plus natural gas liquids) were 29,922 million barrels in 2005, a 2 percent increase from the 2004 level. Natural gas liquids represented 27 percent of total liquid hydrocarbon proved reserves in 2005.

Data

These estimates are based upon analysis of data from Form EIA-23, Annual Survey of Domestic Oil and Gas Reserves, filed by 1,394 operators of oil and gas wells, and Form EIA-64A, Annual Report of the Origin of Natural Gas Liquids Production, filed by operators of 508 active natural gas processing plants. The U.S. proved reserves estimates for crude oil and natural gas are associated with sampling errors of less than 1 percent.

1. Introduction

Background

The primary focus of EIA's reserves program is providing accurate annual estimates of U.S. proved reserves of crude oil, natural gas, and natural gas liquids. These estimates are essential to the development, implementation, and evaluation of national energy policy and legislation. In the past, the Government and the public relied upon industry estimates of proved reserves. However, the industry ceased publication of reserve estimates after its 1979 report.

In response to a recognized need for credible annual proved reserves estimates, Congress, in 1977, required the Department of Energy to prepare such estimates. To meet this requirement, the Energy Information Administration (EIA) developed a program that established a unified, verifiable, comprehensive, and continuing annual statistical series for proved reserves of crude oil and natural gas. It was expanded to include proved reserves of natural gas liquids for the 1979 and subsequent reports.

Survey Overview

EIA defines proved reserves, the major topic of this report, as those volumes of oil and gas that geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions. There are other categories of reserves, but by definition they are more speculative and less precise than proved reserves. Readers who are unfamiliar with the distinctions between types of reserves or with how reserves fit in the description of overall oil and gas resources should see Appendix G.

This report provides proved reserves estimates for calendar year 2005. It is based on data filed by large, intermediate, and a select group of small operators of oil and gas wells on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," and by operators of all natural gas processing plants on Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production." The U.S. crude oil and natural gas proved reserves estimates are associated with sampling errors of less than 1 percent at a 95-percent confidence level.

Form EIA-23

On Form EIA-23, an operator is defined as an organization or person responsible for the management and day-to-day operation of oil and/or gas wells. This definition eliminates responses from royalty owners, working interest owners (unless they are also operators), and others not directly responsible for oil and gas production operations.

Operator size categories are based upon operator annual production as indicated in various Federal, State, and commercial records. Large operators are those that produced at least 1.5 million barrels of crude oil or 15 billion cubic feet of natural gas, or both, during the report year. Intermediate operators produced less than large operators, but more than 400,000 barrels of crude oil or 2 billion cubic feet of natural gas, or both during the report year. Small operators are those that produced less than intermediate operators. All data are reported on a total operated basis, encompassing all proved reserves and production associated with wells operated by an individual operator within a field. This concept is also called the "gross operated" or "8/8ths" basis.

Large operators (Category I) and most intermediate size operators (Category II) report reserves balance data on Form EIA-23 to show how and why reserves components changed during the year on a field-by-field basis. Intermediate size operators who do not keep reserves data were not asked to provide estimates of reserves at the beginning of the year or annual changes to proved reserves by component of change; i.e., revisions, extensions, and new discoveries. These volumes were estimated using statistical calculations that preserved the relative relationships between these items within each State or State subdivision, as reported by large and intermediate operators.

A sample selected from the large group of small (Category III) operators are requested to provide annual production and, if available, year ending reserves volumes. Details on the selection of these operators and the determination of the reserves volumes is found in Appendix F.

The published reserve estimates include an additional term, adjustments, calculated by the EIA, that preserves an exact annual reserves balance of the form:

Published Proved Reserves at End of Previous Report Year
+ Adjustments
+ Revision Increases
– Revision Decreases
– Sales
+ Acquisitions
+ Extensions
+ New Field Discoveries
+ New Reservoir Discoveries in Old Fields
– Report Year Production
= Published Proved Reserves at End of Report Year

Adjustments are the annual changes in the published reserve estimates that cannot be attributed to the estimates for other reserve change categories. They result from the survey and statistical estimation methods employed. For example, variations caused by changes in the operator frame, different random samples, different timing of reporting, incorrectly reported data, or imputations for missing or unreported reserve changes can contribute to adjustments.

Form EIA-64A

Form EIA-64A data were first collected for the 1979 survey year in order to develop estimates for total natural gas liquids reserves. Data on liquids recovered from natural gas, as reported by natural gas processing plant operators, are combined with lease condensate data collected on Form EIA-23 to provide the total natural gas liquids reserves estimates.

Data Collection Operations

An intensive effort is made each year to maintain an accurate and complete survey frame consisting of operators of oil and gas wells and of natural gas processing plants. The Form EIA-23 operator frame contained 15,158 probable active operators and the Form EIA-64A plant frame contained 489 probable active natural gas processing plants in the United States when the 2005 surveys were initiated.

For more details on the survey process, see Appendix E, Summary of Data Collection Operations.

The 2005 survey sample consisted of 1,394 operators. EIA sampled 889 operators with certainty; 172 Category I operators, 522 Category II operators, and 195 smaller operators that were selected with certainty because of their size in relation to the area or areas in which they operated. EIA also chose 505 Noncertainty operators as a systematic random sample of the remaining operators. There were 8 Successor operators in 2005. Forty-seven (47) of the 1,394 ceased operating oil and/or gas properties (became non-operator) during the survey year. For more details on the survey response statistics, see Table E2 in Appendix E, Summary of Data Collection Operations.

EIA mailed EIA-64A forms to all known natural gas processing plant operators as of February 1, 2005. More than one form is received for a plant that has more than one operator during the year. Forms were received from 100 percent of the operators of the 496 unique active natural gas processing plants in 2005.

National estimates of the production volumes for crude oil, lease condensate, natural gas liquids, and dry natural gas based on Form EIA-23 and Form EIA-64A were compared with corresponding official production volumes published by EIA, which are obtained from non-survey based State sources. For report year 2005, the Form EIA-23 National production estimates were 1 percent higher than the comparable *Petroleum Supply Annual (PSA) 2005* volumes for crude oil and lease condensate combined, and were 1 percent higher than the comparable *Natural Gas Monthly, October 2006* volume for 2005 dry natural gas.

Accuracy in reserves reporting is EIA's first and foremost goal for this report. Because of differences in timing and data availability, the estimates of oil and gas production presented in this report may differ from those presented in other EIA reports.

2. Overview

National Summary

The United States had the following proved reserves as of December 31, 2005:

- **Crude Oil — 21,757 million barrels**
- **Dry Natural Gas — 204,385 billion cubic feet**
- **Natural Gas Liquids — 8,165 million barrels.**

This Overview summarizes the 2005 proved reserves balances of crude oil, dry natural gas, and natural gas liquids on a National level and provides historical comparisons between 2005 and prior years. **Table 1** lists the estimated annual reserve balances since 1995 for crude oil, dry natural gas, and natural gas liquids.

Crude Oil

Crude oil proved reserves went up for the first time in 3 years, increasing by 386 million barrels in 2005. **Figure 1** shows the crude oil proved reserves levels by major region and **Figure 2** shows the components of reserves changes from 1995 through 2005.

As indicated in **Figure 1**, U.S. crude oil proved reserves increased onshore in the lower 48 States in 2005, but declined in Alaska and the Federal Offshore.

The components of reserves changes for crude oil are shown in **Figure 2**. EIA tracks all components of reserves changes: adjustments, revision increases, revision decreases, sales, acquisitions, extensions, new field discoveries, new reservoir discoveries in old fields, and estimated production. These components are discussed below.

Total discoveries are those reserves attributable to field extensions, new field discoveries, and new reservoir discoveries in old fields. They result from the drilling of exploratory wells. Total discoveries of crude oil were 1,051 million barrels in 2005, 7 percent less than the prior 10-year average but 34 percent more than 2004's discoveries of 782 million barrels.

The majority of crude oil total discoveries in 2005 came from extensions to fields in Texas, California, Montana, and Wyoming.

New field discoveries accounted for 205 million barrels of crude oil total discoveries. Almost all of these discoveries (201 of 205 million) were in the Gulf of Mexico Federal Offshore. While this was 6 times greater than the new field discoveries of 2004 (33 million barrels), it was only 49 percent of the prior 10-year average (419 million barrels).

Operators discovered 805 million barrels in extensions in 2005, 30 percent more than in 2004 and 53 percent more than the prior 10-year average (527 million barrels).

New reservoir discoveries in old fields were 41 million barrels, 69 percent less than 2004 and only 23 percent of the prior 10-year average (180 million barrels).

Reserves additions are the sum of total discoveries, revisions, adjustments, sales, and acquisitions. In 2005, crude oil reserves additions were 2,119 million barrels, 63 percent more than in 2004 and 13 percent more than the prior 10-year average (1,875 million barrels).

Crude oil net revisions and adjustments were 790 million barrels, 60 percent more than the net revisions and adjustments of 2004 and almost equal to the prior 10-year average (795 million barrels). The net of sales and acquisitions of crude oil proved reserves was 278 million barrels.

U.S. crude oil production declined in 2005 due to lower production in the Gulf of Mexico and Alaska. The Rocky Mountain States generally increased crude oil production in 2005 with the largest increase occurring in Montana (up 36 percent, from 22 to 30 million barrels) owing to development of the Bakken formation of the Williston Basin. Reserves additions of crude oil replaced 122 percent of the 2005 production.

Natural Gas

Dry natural gas proved reserves increased by 11,872 billion cubic feet in 2005. **Figure 3** shows the dry natural gas proved reserves levels by major region. It indicates that additions of gas reserves in the Lower 48 onshore are raising the National total despite declining offshore gas reserves. **Figure 4** shows the components of reserves changes from 1995 through 2005.

Total discoveries of dry natural gas reserves, which is the sum of field extensions, new field discoveries, and

Table 1. Total U.S. Proved Reserves of Crude Oil, Dry Natural Gas, and Natural Gas Liquids, 1995-2005

Year	Adjustments (1)	Net Revisions (2)	Revisions[a] and Adjustments (3)	Net of Sales[b] and Acquisitions (4)	Extensions (5)	New Field Discoveries (6)	New Reservoir Discoveries in Old Fields (7)	Total[c] Discoveries (8)	Estimated Production (9)	Proved[d] Reserves 12/31 (10)	Change from Prior Year (11)
	Crude Oil (million barrels of 42 U.S. gallons)										
1995	122	1,028	1,150	NA	500	114	343	957	2,213	22,351	-106
1996	175	737	912	NA	543	243	141	927	2,173	22,017	-334
1997	520	914	1,434	NA	477	637	119	1,233	2,138	22,546	+529
1998	-638	518	-120	NA	327	152	120	599	1,991	21,034	-1,512
1999	139	1,819	1958	NA	259	321	145	725	1,952	21,765	+731
2000	143	746	889	-20	766	276	249	1,291	1,880	22,045	+280
2001	-4	-158	-162	-87	866	1,407	292	2,565	1,915	22,446	+401
2002	416	720	1,136	24	492	300	154	946	1,875	22,677	+231
2003	163	94	257	-398	426	705	101	1,232	1,877	21,891	-786
2004	74	420	494	23	617	33	132	782	1,819	21,371	-520
2005	221	569	790	278	805	205	41	1,051	1,733	21,757	+386
	Dry Natural Gas (billion cubic feet, 14.73 psia, 60° Fahrenheit)										
1995	580	7,734	8,314	NA	6,843	1,666	2,452	10,961	17,966	165,146	+1,309
1996	3,785	4,086	7,871	NA	7,757	1,451	3,110	12,318	18,861	166,474	+1,328
1997	-590	4,902	4,312	NA	10,585	2,681	2,382	15,648	19,211	167,223	+749
1998	-1,635	5,740	4,105	NA	8,197	1,074	2,162	11,433	18,720	164,041	-3,182
1999	982	10,504	11,486	NA	7,043	1,568	2,196	10,807	18,928	167,406	+3,365
2000	-891	6,962	6,071	4,031	14,787	1,983	2,368	19,138	19,219	177,427	+10,021
2001	2,742	-2,318	424	2,630	16,380	3,578	2,800	22,758	19,779	183,460	+6,033
2002	3,727	937	4,664	380	14,769	1,332	1,694	17,795	19,353	186,946	+3,486
2003	2,841	-1,638	1,203	1,034	16,454	1,222	1,610	19,286	19,425	189,044	+2,098
2004	-114	744	630	1,844	18,198	759	1,206	20,163	19,168	192,513	+3,469
2005	1,887	2,699	4,586	2,544	21,050	942	1,208	23,200	18,458	204,385	+11,872
	Natural Gas Liquids (million barrels of 42 U.S. gallons)										
1995	192	277	469	NA	432	52	67	551	791	7,399	+229
1996	474	175	649	NA	451	65	109	625	850	7,823	+424
1997	-15	289	274	NA	535	114	90	739	864	7,973	+150
1998	-361	208	-153	NA	383	66	88	537	833	7,524	-449
1999	99	727	826	NA	313	51	88	452	896	7,906	+382
2000	-83	459	376	145	645	92	102	839	921	8,345	+439
2001	-429	-132	-561	102	717	138	142	997	890	7,993	-352
2002	62	31	93	54	612	48	78	738	884	7,994	+1
2003	-338	-161	-499	30	629	35	72	736	802	7,459	-535
2004	273	97	370	112	734	26	54	814	827	7,928	+469
2005	-89	21	-68	156	863	32	42	937	788	8,165	+237

[a]Revisions and adjustments = Col. 1 + Col. 2.
[b]Net of sales and acquisitions = acquisitions - sales.
[c]Total discoveries = Col. 5 + Col. 6 + Col. 7.
[d]Proved reserves = Col. 10 from prior year + Col. 3 + Col. 4 + Col. 8 - Col. 9.
NA=Not available.

Notes: Old means discovered in a prior year. New means discovered during the report year. The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves" and Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production." They may differ from the official EIA production data for crude oil, natural gas, and natural gas liquids for 2005 contained in the *Petroleum Supply Annual 2005*, DOE/EIA-0340(05) and the *Natural Gas Annual 2005, DOE/EIA-0131(05).*

Sources: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*, 1995 through 2005 annual reports, DOE/EIA-0216.

Figure 1. U.S. Crude Oil Proved Reserves, 1995-2005

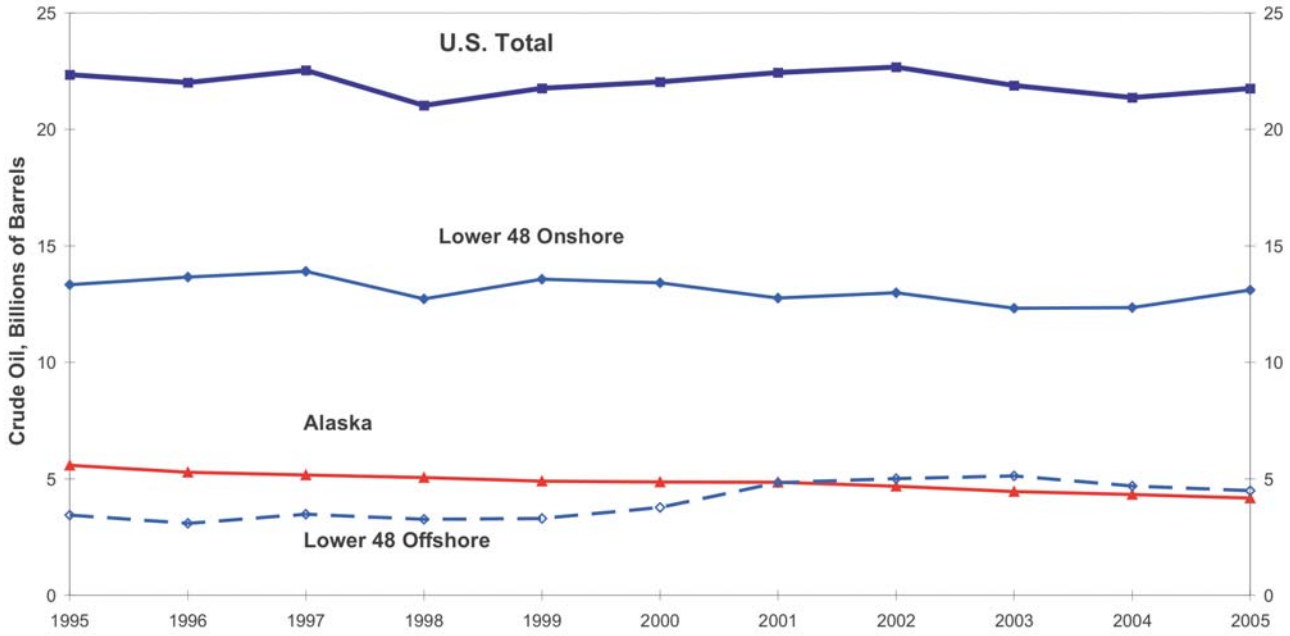
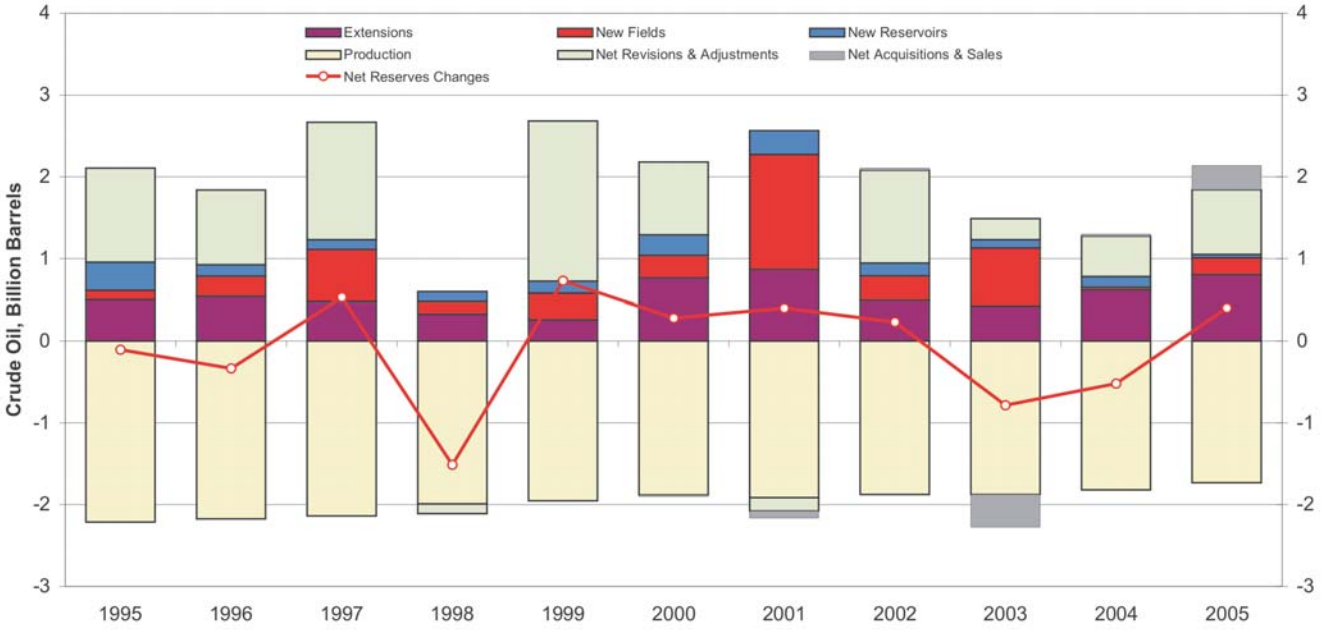


Figure 2. Components of Reserves Changes for Crude Oil, 1995-2005



Source: U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1995-2004 annual reports, DOE/EIA-0216.{19-28}

Figure 3. U.S. Dry Natural Gas Proved Reserves, 1995-2005

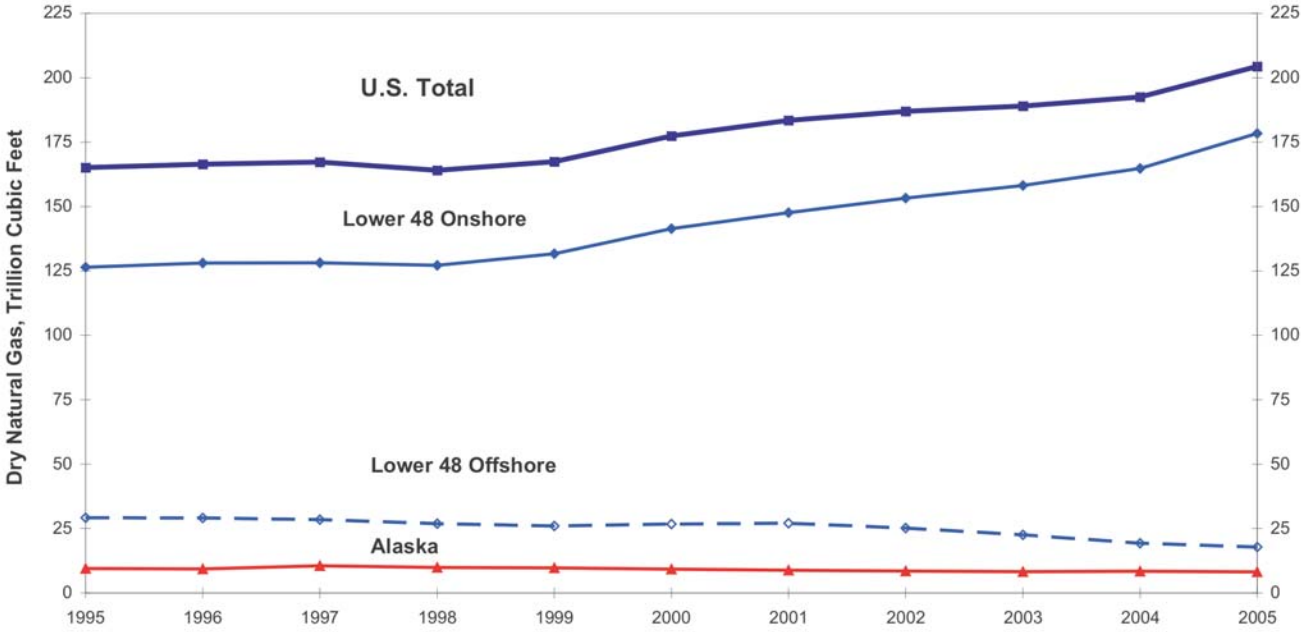
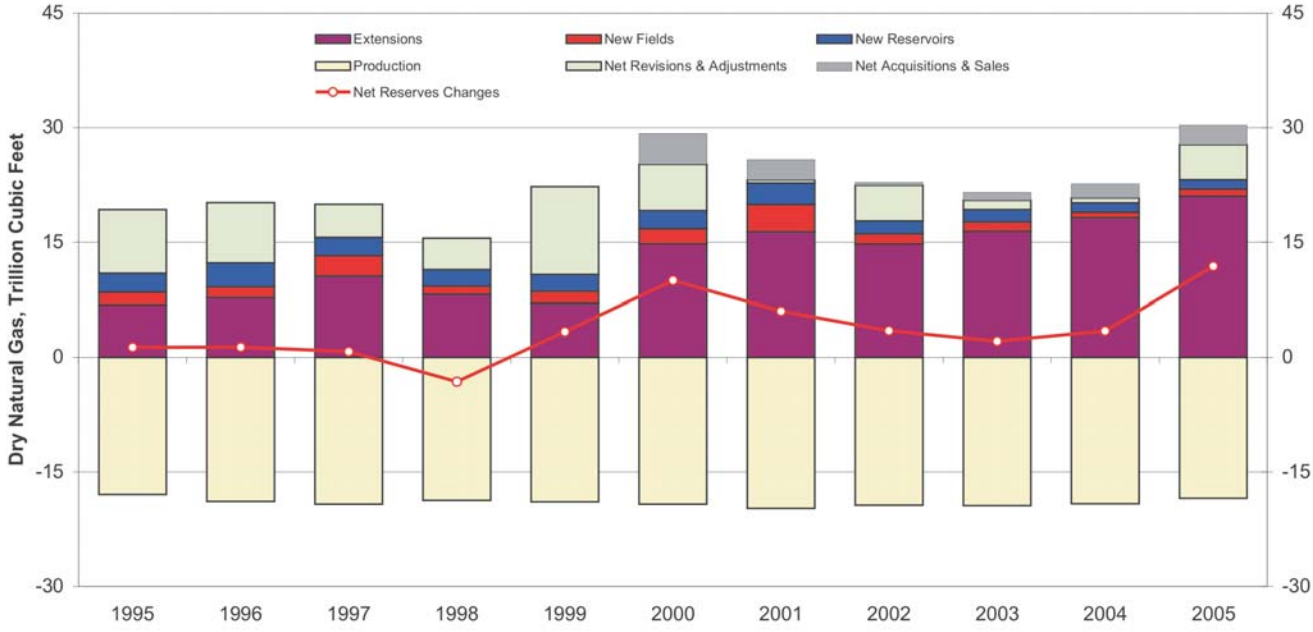


Figure 4. Components of Reserves Changes for Dry Natural Gas, 1995-2005



Source: U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1995-2004 annual reports, DOE/EIA-0216.{19-28}

new reservoir discoveries in old fields, were 23,200 billion cubic feet in 2005. This was 45 percent more than the prior 10-year average and 15 percent more than in 2004.

The majority of natural gas total discoveries in 2005 were from extensions to existing fields. Field extensions were 21,050 billion cubic feet, 16 percent more than in 2004 and 74 percent more than the prior 10-year average (12,101 billion cubic feet).

New field discoveries were 942 billion cubic feet, 24 percent more than the volume discovered in 2004 and 46 percent less than the prior 10-year average (1,731 billion cubic feet).

New reservoir discoveries in old fields were 1,208 billion cubic feet, up slightly from 2004 and 45 percent less than the prior 10-year average (2,198 billion cubic feet).

Natural gas net revisions and adjustments were 4,586 billion cubic feet, which is seven times the net revisions and adjustments of 2004, but 7 percent less that the prior 10-year average (4,908 billion cubic feet). The net of sales and acquisitions of dry natural gas proved reserves was 2,544 billion cubic feet.

Total U.S. natural gas production declined 4 percent in 2005 because, in August and September of 2005, Hurricanes Katrina and Rita wreaked havoc along the Gulf Coast. Beyond devastating much of coastal Alabama, Louisiana, Mississippi, and the flooding of New Orleans, these storms destroyed 113 offshore platforms and seriously damaged offshore pipelines and coastal oil and natural gas processing facilities, impacting the Nation's oil and gas production. At its nadir, natural gas production in the Gulf of Mexico (which accounted for 20 percent of U.S. dry gas production in 2004) was cut by 80 percent. Gulf of Mexico production slowly returned and reached roughly 80 percent of 2005's pre-hurricane production rate (10.2 Bcf/day gross withdrawal in June 2005) in September 2006. For several years before Hurricane Katrina, gas production from the Gulf had been declining about 10 percent per year.

Coalbed natural gas reserves increased 8 percent in 2005 and accounted for 10 percent of U.S. dry natural gas reserves. Coalbed natural gas production increased less than 1 percent from 2004 and accounted for 9 percent of U.S. dry natural gas production.

Natural Gas Liquids

Natural gas liquids reserves are the sum of lease condensate reserves and natural gas plant liquids reserves. Natural gas liquids proved reserves increased 3 percent in 2005. Operators replaced 130 percent of U.S. natural gas liquids production with reserves additions.

Total proved reserves of liquid hydrocarbons (crude oil plus natural gas liquids) were 29,922 million barrels in 2005, a 2 percent increase from the 2004 level. Natural gas liquids represented 27 percent of total liquid hydrocarbon proved reserves in 2005.

Reserves Changes Since 1977

EIA has collected oil and gas reserves estimates annually since 1977. **Table 2** lists the cumulative totals of the components of reserves changes for crude oil and dry natural gas from 1977 through 2005. The table has two sections, one for the lower 48 States and another for the U.S. total (which includes Alaska's contribution). Annual averages for each component of reserves changes are also listed, along with the percentage of that particular component's impact on total U.S. proved reserves. In this section, we compare these averages to the 2005 proved reserves estimates as a means of gauging the past year against history.

Crude Oil: Since 1977 U.S. operators have:

- had average annual new reserves discoveries of 906 million barrels,
- had average annual proved reserves additions of 2,067 million barrels from total discoveries, net revisions and adjustments, and net sales and acquisitions, and
- had an average annual proved reserves decline of 405 million barrels Nationwide, because production exceeded reserve additions.

Since 1977, crude oil reserves have primarily been sustained by proved ultimate recovery appreciation in existing fields rather than by the discovery of new oil fields. Only 12 percent of reserves additions since 1977 were booked as new field discoveries. Proved ultimate recovery appreciation is the sum of net revisions, adjustments, net sales and acquisitions, extensions, and new reservoir discoveries in old fields (see the Proved Ultimate Recovery section later in this chapter.) Since 1977, the 26,260 million barrels of total discoveries accounted for 44 percent of reserves additions.

Figure 5. U.S. Natural Gas Liquids Proved Reserves, 1995-2005

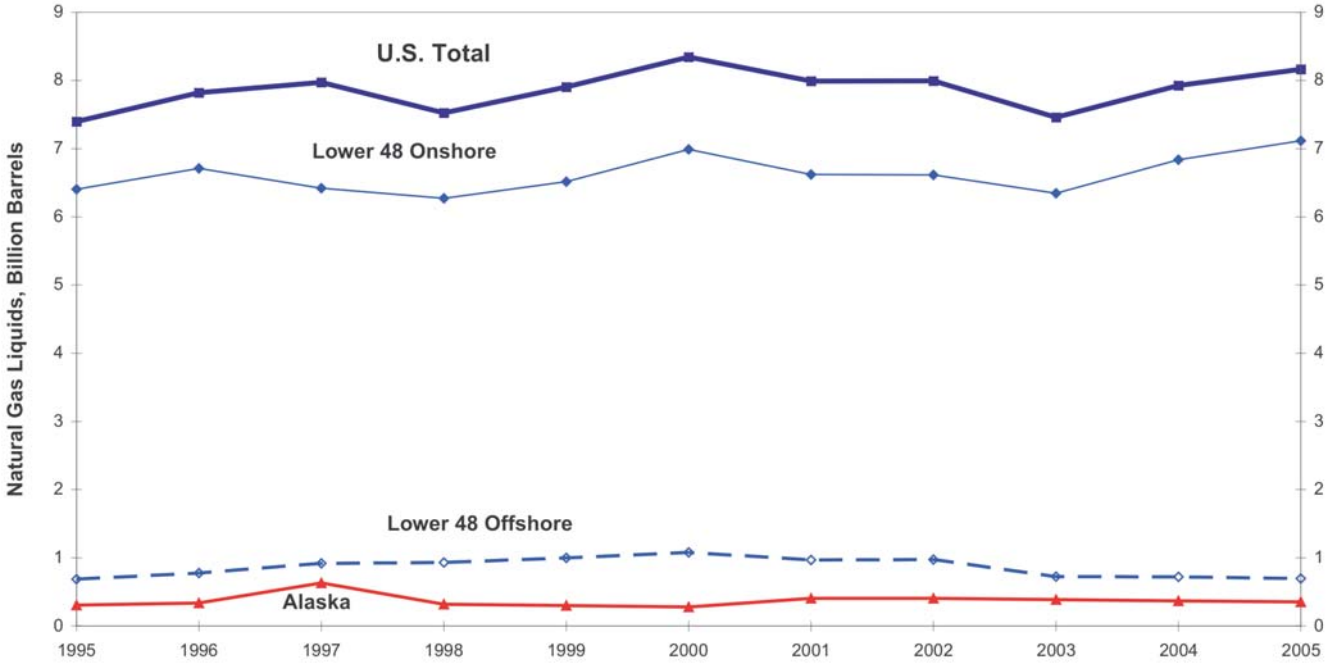
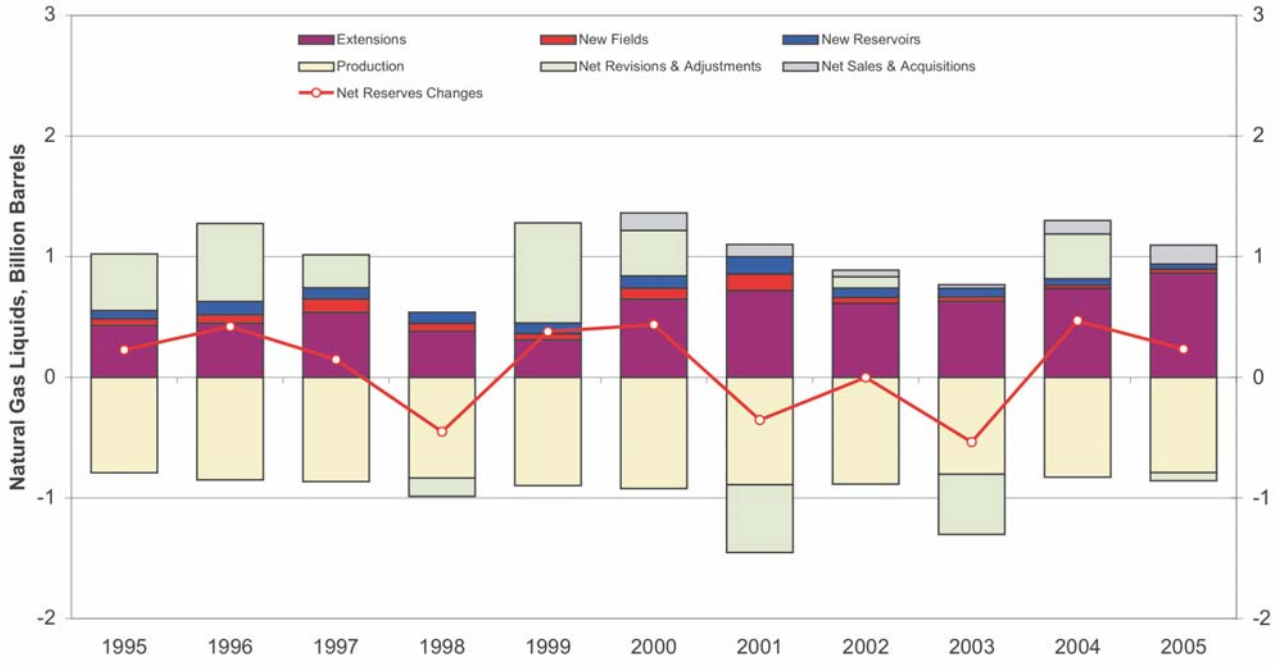


Figure 6. Components of Reserves Changes for Natural Gas Liquids, 1995-2005



Source: U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1995-2004 annual reports, DOE/EIA-0216.{19-28}

Table 2. Reserves Changes, 1977-2005

Components of Change	Lower 48 States			U.S. Total		
	Volume	Average per Year	Percent of Reserves Additions	Volume	Average per Year	Percent of Reserves Additions
	Crude Oil (million barrels of 42 U.S. gallons)					
Proved Reserves as of 12/31/76	**24,928**	**—**	**—**	**33,502**	**—**	**—**
New Field Discoveries	5,930	204	12.0	6,881	237	11.5
New Reservoir Discoveries in Old Fields	3,955	136	8.0	4,143	143	6.9
Extensions	13,478	465	27.4	15,236	525	25.4
Total Discoveries	**23,363**	**806**	**47.5**	**26,260**	**906**	**43.8**
Revisions, Adjustments, Sales & Acquisitions[a]	25,855	892	52.5	33,682	1,161	56.2
Total Reserves Additions	**49,218**	**1,697**	**100.0**	**59,942**	**2,067**	**100.0**
Production	**56,496**	**1,948**	**114.8**	**71,687**	**2,472**	**119.6**
Net Reserves Change	**-7,278**	**-251**	**-14.8**	**-11,745**	**-405**	**-19.6**
	Dry Natural Gas (billion cubic feet at 14.73 psia and 60° Fahrenheit)					
Proved Reserves as of 12/31/76	**180,838**	**—**	**—**	**213,278**	**—**	**—**
New Field Discoveries	53,849	1,857	10.2	54,113	1,866	10.5
New Reservoir Discoveries in Old Fields	69,288	2,389	13.1	69,747	2,405	13.6
Extensions	270,580	9,330	51.3	273,853	9,443	53.2
Total Discoveries	**393,717**	**13,576**	**74.6**	**397,713**	**13,714**	**77.3**
Revisions, Adjustments, Sales & Acquisitions[a]	134,101	4,624	25.4	116,641	4,022	22.7
Total Reserves Additions	**527,818**	**18,201**	**100.0**	**514,354**	**17,736**	**100.0**
Production	**512,442**	**17,670**	**97.1**	**523,247**	**18,043**	**101.7**
Net Reserves Change	**15,376**	**530**	**2.9**	**-8,893**	**-307**	**-1.7**

[a] EIA did not separately collect data on sales and acquisitions of proved reserves until the year 2000.
Source: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves* 1977-2005 annual reports, DOE/EIA-0216.{1-28}

Compared to the averages of reserves changes since 1977, 2005 was an up year for crude oil discoveries. Total discoveries of crude oil (1,051 million barrels) in 2005 were 16 percent more than the post-1976 U.S. average (906 million barrels per year).

Looking at the components of total discoveries in 2005:

- Extensions in 2005 (805 million barrels) were 53 percent more than the post-1976 average (525 million barrels),
- 2005's new field discoveries (205 million barrels) were 14 percent less than the post-1976 average for crude oil (237 million barrels), and
- New reservoir discoveries in old fields (41 million barrels) were 71 percent less than the post-1976 average (143 million barrels).

Revisions, Adjustments, Sales & Acquisitions were 1,068 million barrels in 2005. This was 8 percent less than the post-1976 average of 1,161 million barrels per year.

Dry Natural Gas: Since 1977 U.S. operators have:

- had average annual new reserves discoveries of 13,714 billion cubic feet,
- had average annual proved reserves additions of 17,736 billion cubic feet from total discoveries, net revisions and adjustments, and net sales and acquisitions, and
- had an average annual production of 18,043 billion cubic feet, decreasing U.S. dry natural gas reserves by an average 307 billion cubic feet per year.

Like crude oil reserves, natural gas reserves have primarily been sustained by proved ultimate recovery appreciation since 1977. For gas, extensions rather than net revisions and adjustments are usually the largest component. Extensions accounted for 53 percent of all reserves additions since 1977 while net revisions and adjustments accounted for only 23 percent.

Compared to the averages of reserves changes since 1977, 2005 was an up year for dry natural gas total

Table 3. U.S. Average Annual Domestic First Purchase Prices for Crude Oil, Wellhead Prices for Natural Gas, and the Average Number of Active Rotary Drilling Rigs, 1977-2005

Year		Crude Oil		Natural Gas		
		Current	2005 Constant	Current	2005 Constant	
		(dollars per barrel)		(dollars per thousand cubic feet)		Number of Rigs
1977		8.57	22.22	0.79	2.05	2,001
1978		9.00	21.78	0.91	2.20	2,259
1979		12.64	28.24	1.18	2.64	2,177
1980		21.59	44.16	1.59	3.25	2,909
1981		31.77	59.45	1.98	3.70	3,970
1982		28.52	50.23	2.46	4.33	3,105
1983		26.19	44.38	2.59	4.39	2,232
1984		25.88	42.28	2.66	4.35	2,428
1985		24.09	38.15	2.51	3.97	1,980
1986		12.51	19.38	1.94	3.01	964
1987		15.40	23.17	1.67	2.51	936
1988		12.58	18.30	1.69	2.46	936
1989		15.86	22.23	1.69	2.37	869
1990		20.03	27.01	1.71	2.31	1,010
1991		16.54	21.53	1.64	2.13	860
1992		15.99	20.32	1.74	2.21	721
1993		14.25	17.68	2.04	2.53	754
1994		13.19	16.03	1.85	2.25	775
1995		14.62	17.39	1.55	1.84	723
1996		18.46	21.54	2.17	2.53	779
1997		17.23	19.72	2.32	2.66	943
1998		10.87	12.29	1.96	2.22	827
1999		15.56	17.35	2.19	2.44	625
2000		26.72	29.17	3.68	4.02	918
2001		21.84	23.29	4.00	4.27	1,156
2002		22.51	23.74	2.95	3.11	830
2003		27.56	28.60	4.88	5.06	1,032
2004	January	30.35	31.21	5.21	5.36	1,101
	February	31.21	32.05	5.02	5.16	1,119
	March	32.86	33.70	5.12	5.25	1,135
	April	33.20	34.01	5.03	5.15	1,151
	May	35.73	36.55	5.40	5.52	1,164
	June	34.53	35.26	5.82	5.94	1,176
	July	36.54	37.23	5.62	5.73	1,213
	August	40.10	40.78	5.52	5.61	1,234
	September	40.56	41.18	5.06	5.14	1,240
	October	46.14	46.76	5.43	5.50	1,240
	November	42.85	43.35	6.21	6.28	1,262
	December	38.22	38.61	6.01	6.07	1,246
2004	**Average**	**36.77**	**37.51**	**5.46**	**5.57**	**1,192**
2005	January	40.18	40.53	5.52	5.57	1,255
	February	42.19	42.50	5.59	5.63	1,276
	March	47.56	47.84	5.98	6.02	1,306
	April	47.26	47.48	6.44	6.47	1,334
	May	44.03	44.18	6.02	6.04	1,320
	June	49.83	49.93	6.15	6.16	1,355
	July	53.35	53.40	6.69	6.70	1,398
	August	58.90	58.87	7.68	7.68	1,436
	September	59.64	59.53	9.50	9.48	1,452
	October	56.99	56.79	10.97	10.93	1,479
	November	53.20	52.92	9.54	9.49	1,486
	December	53.24	52.87	10.02	9.95	1,470
2005	**Average**	**50.28**	**50.28**	**7.51**	**7.51**	**1,383**

Sources: Current dollars and number of rigs: *Monthly Energy Review September 2006*, DOE/EIA-0035(2006/09). 2005 constant dollars: U.S. Department of Commerce, Bureau of Economic Analysis, Gross Domestic Product Implicit Price Deflators, October 2006.

discoveries. Operators reported 23,200 billion cubic feet of total discoveries of dry natural gas proved reserves, 69 percent more than the post-1976 average (13,714 billion cubic feet).

The net of revisions, adjustments, sales, and acquisitions was 7,130 billion cubic feet in 2005, 77 percent higher than the post-1976 U.S. average (4,022 billion cubic feet per year).

For the seventh year in a row (and 11 out of the last 12 years), the annual change to the National total of gas reserves has been positive, not negative.

Economics and Drilling

Economics: Table 3 lists the average annual domestic wellhead prices of crude oil and natural gas from 1977 to 2005.

In 2005, the U.S. crude oil first purchase price started at a monthly average of $40.18 per barrel in January, rose to a high of $59.64 in September, and ended the year at $53.24 per barrel in December. The average annual U.S. crude oil first purchase price increased from $36.77 in 2004 to $50.28 per barrel in 2005.

Oil prices vary by region. The average annual 2005 crude oil first purchase price ranged from $52.61 per barrel in Texas through $47.08 per barrel in California, $55.34 per barrel in Colorado, and $53.47 per barrel in Ohio, to a low of $43.48 per barrel in the California Federal Offshore. {29}

The average annual wellhead natural gas price increased from $5.46 per thousand cubic feet in 2004 to $7.51 in 2005. Monthly average natural gas prices started at $5.52 per thousand cubic feet in January 2005, rose to a high of $10.97 in October, and ended the year at $10.02 per thousand cubic feet in December 2005. {30}

Drilling: Also listed in **Table 3** is the average number of active rotary drilling rigs from 1977 to 2005. From 2004 to 2005, the annual average active rig count rose from 1,192 to 1,383, a 16 percent increase.

Looking first at exploratory wells, there were 3,458 exploratory wells drilled in 2005 (**Table 4**). Of these, 12 percent were completed as oil wells, 42 percent were completed as gas wells, and 46 percent were dry holes. Exploratory oil and gas completions (excluding dry holes) in 2005 were 12 percent more (**Figure 7**) than the revised 2004 total.

Figures 9 and 10 show the average volume of discoveries per exploratory well for dry natural gas and oil, respectively, since 1977. The 2005 average volume of oil discoveries per exploratory well increased 5 percent compared to 2004. The 2005 average volume of gas discoveries per exploratory well increased 5 percent compared to 2004.

The number of successful development wells increased by 28 percent for oil and by 27 percent for gas from their 2004 levels (**Figure 8**). Including dry holes, there were an estimated 41,874 exploratory and development wells drilled in 2005. This is 27 percent more than in 2004 and 57 percent more than the average number of wells drilled annually in the prior 10 years (26,705).

For the twelfth year in a row, the number of gas well completions exceeded the number of oil well completions in both the exploratory and development categories.

Mergers and Acquisitions

The following large mergers and acquisitions were announced in 2005 and are expected to have an impact on the energy industry in the future:

On August 10, 2005, Chevron Corporation announced that it had completed its merger with Unocal Corporation. Unocal's stockholders agreed to Chevron's offer, which was originally announced on April 4, 2005, and rejected a higher bid tendered on June 24, 2005 by Chinese oil company CNOOC Ltd. The merger will reportedly increase Chevron's proved reserves (based on year-end 2004 reporting and including the company's share of equity affiliates) by more than 15 percent. {31}

On April 26, 2005, Valero Energy Corporation agreed to acquire refiner Premcor Incorporated for $8.9 billion in cash and stock plus the assumption of about $1.8 billion of debt. The merger created the largest refiner of crude oil in North America and marks a major step in the U.S. refinery industry's rapid consolidation. The deal between Valero and Premcor will give Valero total refining capacity of 3.3 million barrels per day and will raise it above Exxon Mobil Corporation's North American refinery capacity. Valero will then claim about 13 percent of the U.S. market for refined products. {32}

Table 4. U.S. Exploratory and Development Well Completions,[a] 1973-2005

	Exploratory				Total Exploratory and Development			
Year	Oil	Gas	Dry	Total	Oil	Gas	Dry	Total
1973	642	1,067	5,952	7,661	10,167	6,933	10,320	27,420
1974	859	1,190	6,833	8,882	13,647	7,138	12,116	32,901
1975	982	1,248	7,129	9,359	16,948	8,127	13,646	38,721
1976	1,086	1,346	6,772	9,204	17,688	9,409	13,758	40,855
1977	1,164	1,548	7,283	9,995	18,745	12,122	14,985	45,852
1978	1,171	1,771	7,965	10,907	19,181	14,413	16,551	50,145
1979	1,321	1,907	7,437	10,665	20,851	15,254	16,099	52,204
1980 R	1,777	2,099	9,081	12,957	32,959	17,461	20,785	71,205
1981 R	2,651	2,522	12,400	17,573	43,887	20,250	27,953	92,090
1982 R	2,437	2,133	11,307	15,877	39,459	19,076	26,379	84,914
1983 R	2,030	1,605	10,206	13,841	37,366	14,684	24,355	76,405
1984 R	2,209	1,528	11,321	15,058	42,906	17,338	25,884	86,128
1985 R	1,680	1,200	8,954	11,834	35,261	14,324	21,211	70,796
1986 R	1,084	797	5,567	7,448	19,213	8,599	12,799	40,611
1987 R	926	756	5,052	6,734	16,210	8,096	11,167	35,473
1988 R	855	747	4,711	6,313	13,646	8,578	10,119	32,343
1989 R	607	706	3,934	5,247	10,230	9,522	8,236	27,988
1990 R	664	693	3,793	5,150	12,445	11,126	8,496	32,067
1991 R	601	544	3,390	4,535	12,035	9,611	7,882	29,528
1992 R	498	427	2,550	3,475	9,019	8,305	6,284	23,608
1993 R	509	541	2,509	3,559	8,764	10,174	6,513	25,451
1994 R	579	740	2,465	3,784	7,001	9,739	5,515	22,255
1995 R	549	583	2,279	3,411	7,827	8,454	5,319	21,600
1996 R	496	591	2,246	3,333	8,760	9,539	5,587	23,886
1997 R	434	543	2,178	3,155	10,445	11,186	5,955	27,586
1998 R	286	510	1,649	2,445	6,979	11,127	4,805	22,911
1999 R	156	519	1,167	1,842	4,314	11,121	3,504	18,939
2000 R	267	615	1,349	2,231	7,585	16,242	4,046	27,873
2001 R	330	972	1,716	3,018	8,186	21,403	4,432	34,021
2002 R	239	701	1,283	2,223	6,226	16,728	3,610	26,564
2003 R	326	892	1,266	2,484	7,465	19,522	3,688	30,675
2004 R	353	1,323	1,200	2,876	7,703	21,816	3,474	32,993
2005	429	1,452	1,577	3,458	9,833	27,397	4,644	41,874

[a]Excludes service wells and stratigraphic and core testing.
R = Revised Data.
Notes: Estimates include only the original drilling of a hole intended to discover of further develop already discovered oil or gas resources. Other drilling activities, such as drilling an old well deeper, drilling of laterals from the original well, drilling of service and injection wells, and drilling for resources other than oil and gas are excluded.

Source: Table 5.2, EIA *Monthly Energy Review October 2006*, DOE/EIA-0035(2006/10).

Figure 7. U.S. Exploratory Well Completions, 1995-2005

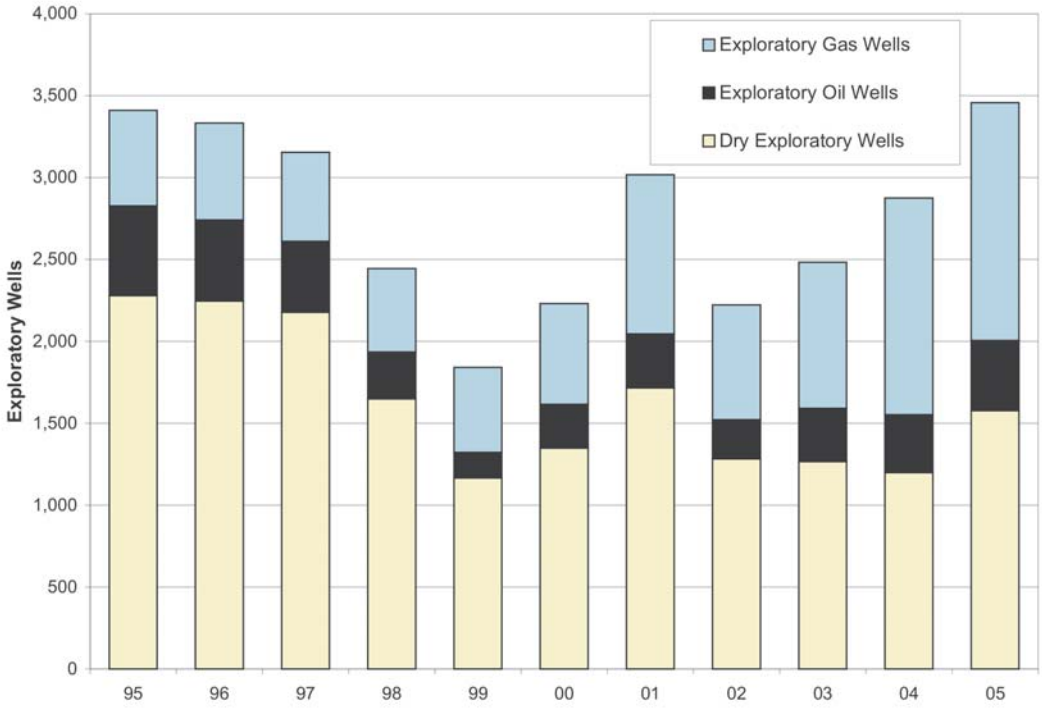
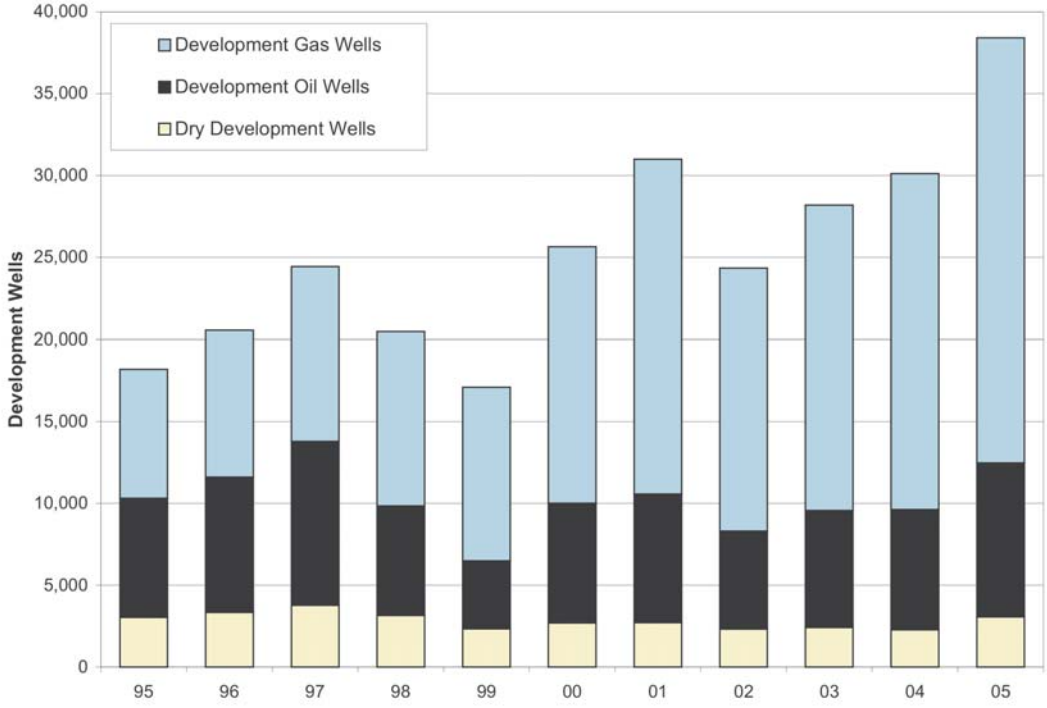


Figure 8. U.S. Development Well Completions, 1995-2005



Source: Energy Information Administration, Office of Oil and Gas.

Figure 9. U.S. Total Discoveries of Dry Natural Gas per Exploratory Gas Well Completion, 1977-2005

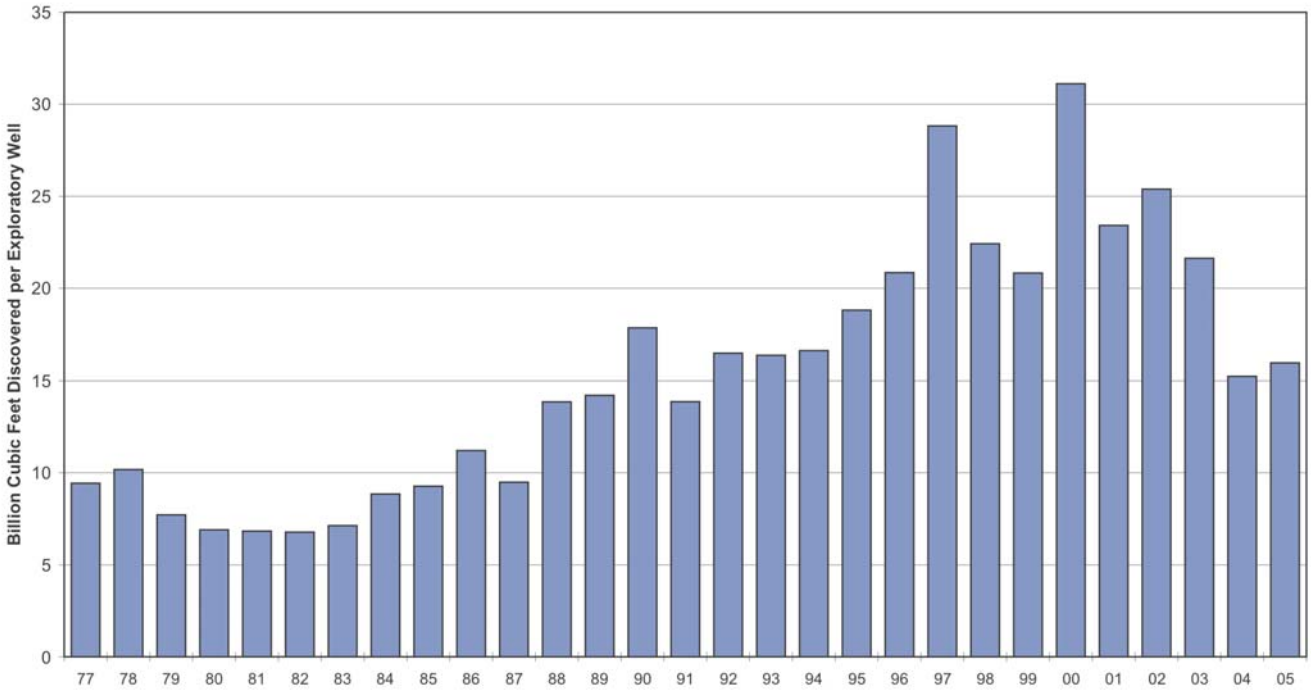
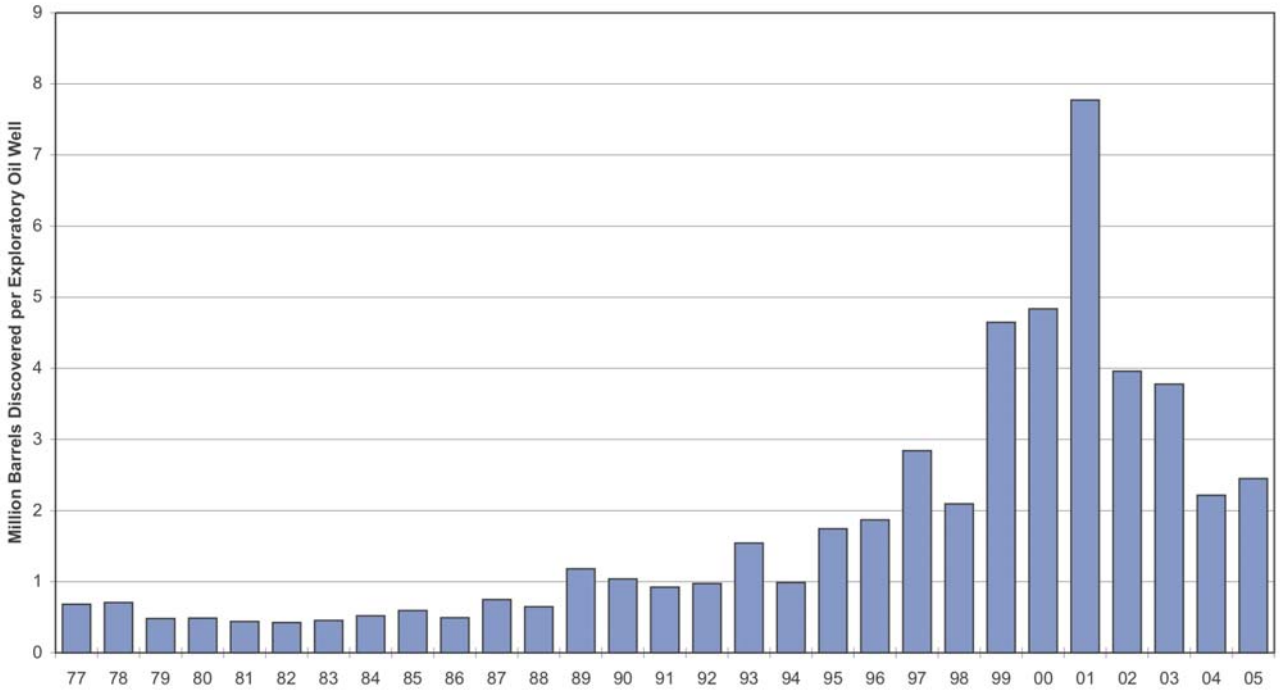


Figure 10. U.S. Total Discoveries of Crude Oil per Exploratory Oil Well Completion, 1977-2005



Source: Energy Information Administration, Office of Oil and Gas.

On May 9, 2005, Duke Energy and Cinergy announced their merger. The combined company, to be named Duke Energy Corporation, through its joint venture with ConocoPhillips, is now the largest producer of natural gas liquids in North America. {33}

Reserve-to-Production Ratio and Ultimate Recovery

R/P Ratios

The relationship between proved reserves and production levels, expressed as the ratio of reserves to production (R/P ratio) is often used in analyses. For a mature producing area, the R/P ratio tends to be reasonably stable, so that the proved reserves at the end of a year serve as a rough guide to the production level that can be maintained during the following year. Operators report data which yield R/P ratios that vary widely by area depending upon:

- category of operator
- geology and economics
- number and size of new discoveries
- amount of drilling that has occurred.

R/P ratios are an indication of the state of development in an area and, over time, the ratios change. For example, when the Alaskan North Slope oil reserves were booked, the U.S. R/P ratio for crude oil increased because significant production from these reserves did not begin until 7 years after booking due to the need to first build the Trans Alaska pipeline. The U.S. R/P ratio for crude oil decreased from 11.1-to-1 to 9.4-to-1 between 1977 and 1982 as Alaskan North Slope oil production reached high levels.

In 2005, U.S. crude oil proved reserves increased and oil production decreased, increasing the National average R/P ratio from 11.8 to 12.6.

Figure 11 shows the U.S. R/P ratio trend for crude oil since 1945. After World War II, increased drilling and discoveries led to a greater R/P ratio. Later, when drilling found fewer reserves than were produced, the ratio became smaller. R/P ratios also vary geographically, because of differences in development history and reservoir conditions. The 2005 National average R/P ratio for crude oil was 12.6-to-1. Areas with relatively high R/P ratios are the Permian Basin of Texas and New Mexico, and California, where enhanced oil recovery techniques such as carbon dioxide (CO_2) injection or steamflooding have improved the recoverability of oil in old, mature fields. Areas that have the lowest R/P ratios, like the Mid-Continent region, usually have many older fields. There, new technologies such as horizontal drilling have helped to add reserves equivalent to the annual production, keeping the regional reserves and R/P ratio for oil relatively stable.

Figure 12 shows the historical R/P ratio for wet natural gas since 1945. Prior to 1945, R/P ratios were very high since the interstate pipeline infrastructure was not well developed. The market for natural gas grew rapidly after World War II, lowering the R/P ratio. From 2004 to 2005 the U.S. average R/P ratio for natural gas increased from 10.1 to 11.1 since proved reserves increased and production decreased.

Different marketing, transportation, and production characteristics for gas are seen when looking at regional average R/P ratios as compared to the 2005 U.S. average R/P ratio of about 11.1-to-1. Areas with a higher range of R/P ratios than the National average were the Pacific offshore and the Rockies. Several major gas producing areas have R/P ratios below the National average, particularly Texas, the Gulf of Mexico Federal Offshore, and Oklahoma.

Proved Ultimate Recovery

Proved Ultimate Recovery is the sum of proved reserves and cumulative production at a specified point in time. It measures the maximum recoverable volume *known* at that time and is a dynamic quantity that is expected to change over time for any field, group of fields, State, or Country. In most instances, therefore, an estimate of Proved Ultimate Recovery does not represent the all-time maximum recoverable volume of resources for a given field or area. Also, the proved ultimate recovery of a field, a group of fields, a State, or a Country grows (appreciates) over time in most instances.

Figures 13 and 14 show successive estimates of proved ultimate recovery for the United States. The figures show proved reserves and cumulative production for *crude oil plus lease condensate* and *wet natural gas*, over the period 1977 through 2005. They illustrate the continued appreciation (growth) of proved ultimate recovery over time.

In 1977, U.S. *crude oil plus lease condensate* proved reserves were 33,615 million barrels. Cumulative production of *crude oil plus lease condensate* for 1977 through 2005 was 73,640 million barrels. This

Figure 11. Reserves-to-Production Ratios for Crude Oil, 1945-2005

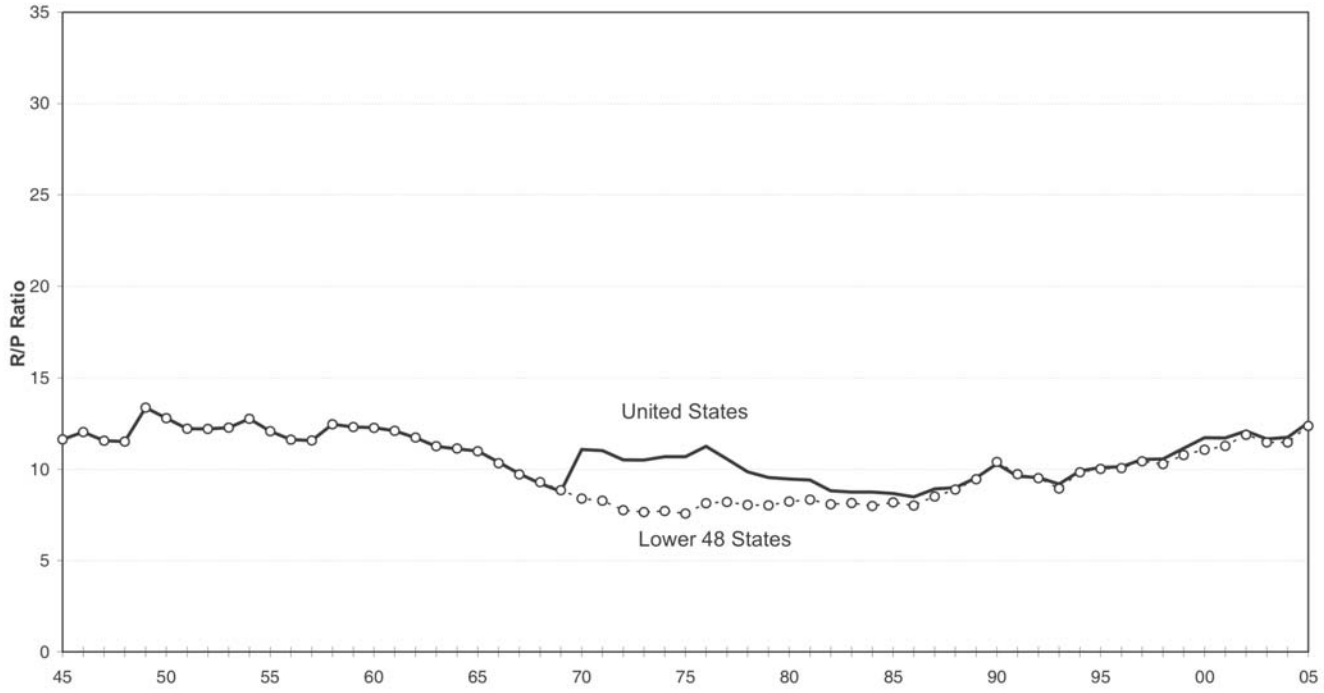
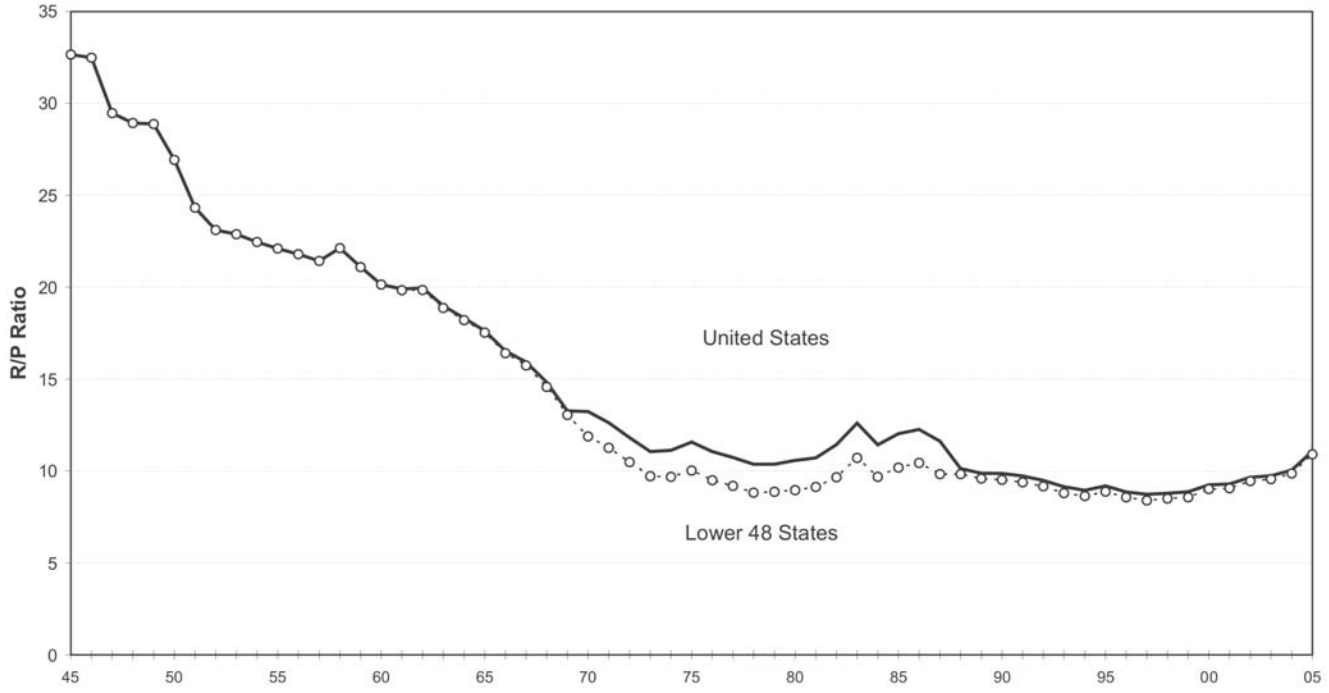


Figure 12. Reserves-to-Production Ratios for Wet Natural Gas, 1945-2005



Sources: Annual reserves and production - American Petroleum Institute and American Gas Association (1945–1976) {34} and Energy Information Administration, Office of Oil and Gas (1977–2004){1-28}. Cumulative production: *U.S. Oil and Gas Reserves by Year of Field Discovery* (1977-1988).{35}

Figure 13. Components of Proved Ultimate Recovery for Crude Oil and Lease Condensate, 1977-2005

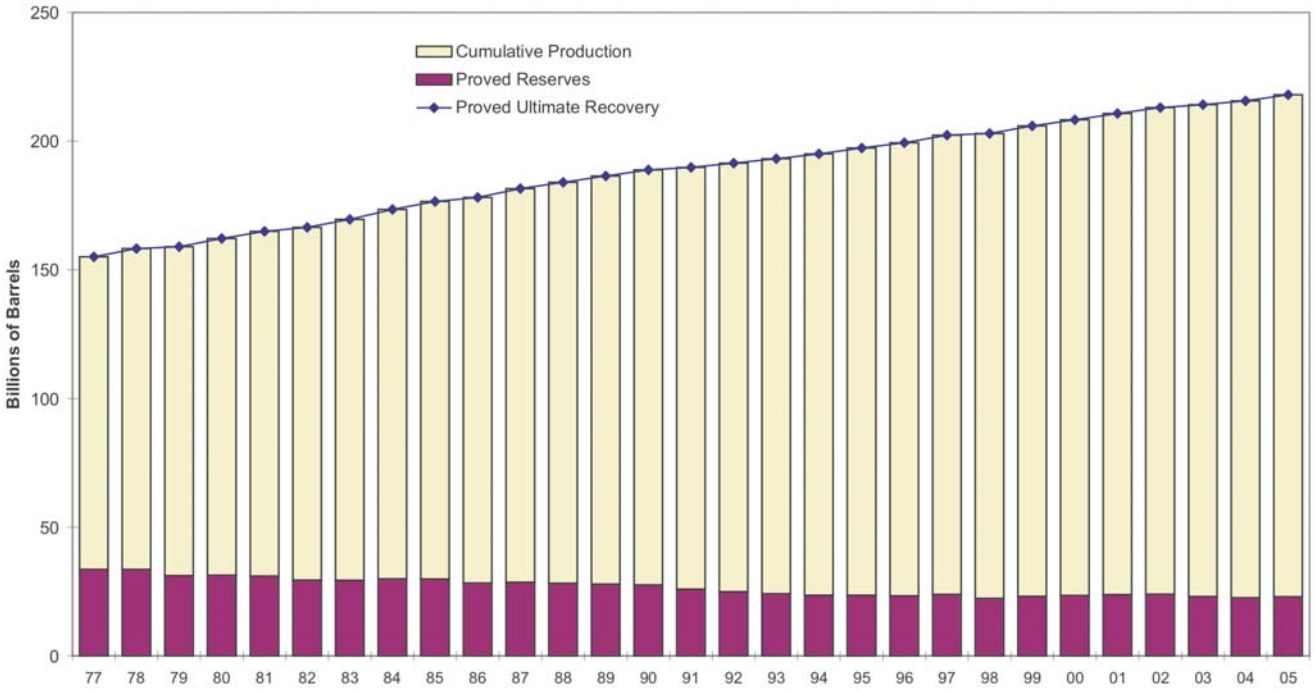
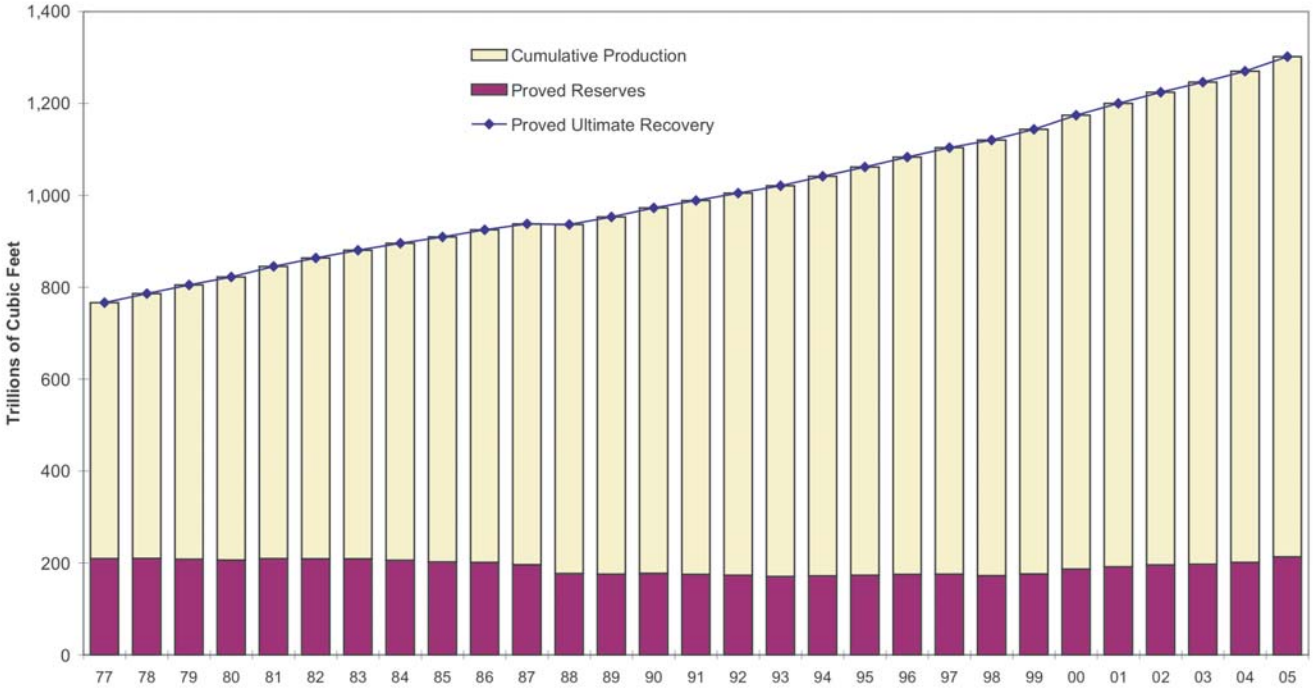


Figure 14. Components of Proved Ultimate Recovery for Wet Natural Gas, 1977-2005



Sources: Annual reserves and production - American Petroleum Institute and American Gas Association (1945–1976) {34} and Energy Information Administration, Office of Oil and Gas (1977–2004){1-28}. Cumulative production: *U.S. Oil and Gas Reserves by Year of Field Discovery* (1977-1988).{35}

Table 5. International Oil and Natural Gas Reserves as of December 31, 2005

Oil (million barrels)				Natural Gas (billion cubic feet)			
Rank[a]	Country	Oil & Gas Journal	World Oil	Rank[b]	Country	Oil & Gas Journal	World Oil
1	Saudia Arabia[c]	[d]266,810	[d]262,175	1	Russia	1,680,000	1,688,749
2	Iran[c]	132,460	131,500	2	Iran[c]	971,150	965,000
3	Iraq[c]	115,000	115,000	3	Qatar[c]	910,520	906,000
4	Kuwait[c]	[d]104,000	[d]100,875	4	Saudia Arabia[c]	[d]241,840	[d]243,500
5	Canada[e]	178,792	12,025	5	United Arab Emirates[c]	214,400	205,550
6	United Arab Emirates[c]	97,800	70,250	6	United States	204,385	204,385
7	Russia	60,000	74,400	7	Nigeria[c]	184,660	182,000
8	Venezuela[c]	79,729	52,650	8	Algeria[c]	160,505	160,682
9	Libya[c]	39,126	34,050	9	Venezuela[c]	151,395	150,890
10	Nigeria[c]	35,876	37,175	10	Iraq[c]	111,950	84,000
Top 10 Total		**1,109,593**	**890,100**	**Top 10 Total**		**4,830,805**	**4,790,756**
11	United States	21,757	21,757	11	Indonesia[c]	97,786	91,500
12	Qatar[c]	15,207	20,346	12	Norway	84,260	83,272
13	China	18,250	16,189	13	Australia	27,640	119,500
14	Mexico	12,882	12,353	14	Turkmenistan	71,000	-
15	Brazil	11,243	11,925	15	Malaysia	75,000	58,000
16	Algeria[c]	11,350	11,350	16	Uzbekistan	66,200	-
17	Kazakhstan	9,000	-	17	Kazakhstan	65,000	-
18	Norway	7,705	8,246	18	Egypt	58,500	66,840
19	Angola	5,412	9,050	19	Kuwait[c]	[d]56,015	[d]57,000
20	Azerbaijan	7,000	-	20	Netherlands	62,000	50,500
21	Oman	5,506	4,790	21	Canada	56,577	53,700
22	India	5,848	3,980	22	China	53,325	55,606
23	Ecuador	4,630	5,145	23	Libya[c]	52,650	51,500
24	Indonesia[c]	4,301	5,025	24	Ukraine	39,600	-
25	United Kingdom	4,029	3,750	25	India	38,800	27,259
Top 25 Total		**1,253,713**	**1,024,006**	**Top 25 Total**		**5,735,238**	**5,448,433**
OPEC Total		**901,659**	**840,396**	**OPEC Total**		**3,152,871**	**3,097,622**
World Total		**1,292,550**	**1,119,058**	**World Total**		**6,112,144**	**6,215,220**

[a]Rank is based on an average of oil reserves reported by *Oil & Gas Journal* and *World Oil*.
[b]Rank is based on an average of natural gas reserves reported by *Oil & Gas Journal* and *World Oil*.
[c]Member of the Organization of Petroleum Exporting Countries (OPEC).
[d]Includes one-half of the reserves in the Neutral Zone.
[E]*Oil and Gas Journal* Canadian oil reserves include heavy (low gravity) oil.

Note: The Energy Information Administration does not certify these international reserves data, but reproduces the information as a matter of convenience for the reader.

Sources: PennWell Publishing Company, *Oil and Gas Journal*, Vol. 103, No. 47 (December 19, 2005). Gulf Publishing Company, *World Oil*, Vol. 227, No. 9 (September, 2006).

substantially exceeds the 1977 proved reserves, but at the end of 2005 there were still 23,019 million barrels of *crude oil plus lease condensate* proved reserves. Therefore, the Nation's estimated proved ultimate recovery of crude oil was fundamentally increased during this period owing to the *proved ultimate recovery appreciation* phenomenon that typically accompanies the continued development of old fields. In fact, only 12 percent of proved reserves additions of crude oil were booked as *new field discoveries* from 1976 through 2005. The other 88 percent came from the proved reserves categories related to the proved ultimate recovery appreciation process.

Similarly, the 1977 *wet natural gas* proved reserves were 209,490 billion cubic feet, but 531 trillion cubic feet of gas was produced from 1977 through 2005 and there are still 213,308 billion cubic feet of *wet natural gas* proved reserves in 2005. Only 11 percent of proved reserve additions of natural gas were booked as *new field discoveries* from 1976 through 2005. The other 89 percent came from proved ultimate recovery appreciation.

International Perspective

International Reserves

The EIA estimates domestic oil and gas reserves but does not systematically estimate worldwide reserves. As shown in **Table 5**, international reserves estimates are presented in two widely circulated trade publications. The world's total reserves are estimated to be roughly 1.2 trillion barrels of oil and 6.2 quadrillion cubic feet of gas.

The United States ranked 11th in the world for proved reserves of crude oil and 6th for natural gas in 2005. A comparison of EIA's U.S. proved reserves estimates with worldwide estimates obtained from other sources shows that the United States had 2 percent of the world's total crude oil proved reserves and 3 percent of the world's total natural gas proved reserves at the end of 2005. There are sometimes substantial differences between the estimates from these sources. The *Oil & Gas Journal* reported oil reserves for Canada at about 179 billion barrels. This is much higher than the *World Oil* estimate of 12 billion. The *Oil and Gas Journal* estimate includes heavy oil from Canadian tar sands, the *World Oil* estimate does not. Another reason (among many) for these differences is that condensate is often included in foreign oil reserve estimates.

The *Oil & Gas Journal* {35} estimate for world oil reserves increased 1 percent in 2004 owing to an increase in its estimate of Saudi Arabian and Iranian reserves. The *World Oil* {36} estimate increased 3 percent in 2005 due to its larger estimate of Russian and Canadian reserves. For world gas reserves, the *Oil & Gas Journal* reported a 1 percent increase, while *World Oil* reported an 11 percent decrease in 2005. The decrease in World Oil's estimate is from lower estimates of Russian, Indonesian, and Australian gas reserves.

Several foreign countries have oil reserves considerably larger than those of the United States. Saudi Arabian oil reserves are the largest in the world, dwarfing U.S. oil reserves. Iraqi oil reserves are almost 5 times U.S. reserves. Closer to home, Venezuela and Canada have about 3 times U.S. Reserves based on averages of the *World Oil* and *Oil & Gas Journal* estimates.

Petroleum Consumption

The United States is the world's largest energy consumer. The EIA estimates energy consumption and publishes it in its *Annual Energy Review*.{38} In 2005:

- The U.S. consumed 99,894,000,000,000,000 Btu of energy (99.9 quadrillion Btu). This was a decrease of 0.52 quadrillion Btu from the 2004 level of consumption.
- 63 percent of U.S. energy consumption was provided by petroleum and natural gas—crude oil and natural gas liquids combined (40 percent), and natural gas (23 percent).
- U.S. petroleum consumption was about 21 million barrels of oil and natural gas liquids and 60 billion cubic feet of gas per day.

Dependence on Imports

The United States remains dependent on imported oil and gas. In 2005, crude oil imports made up 66 percent of the U.S. crude oil supply. Canada, Mexico, Saudi Arabia, Venezuela, Nigeria, and Iraq were the primary foreign suppliers of petroleum to the United States.{39}

Net gas imports increased from the 2004 total of 4.26 trillion cubic feet to 4.33 trillion cubic feet in 2005. Imports satisfied approximately 20 percent of consumption. Almost all of this gas was pipelined from Canada. Some liquefied natural gas was imported from

Trinidad and Tobago, Algeria, and for the first time ever, Russia.

List of Appendices

Appendix A: Operator Level Data - How much of the National total of proved reserves are operated by the large oil and gas corporations? Appendix A separates the large operators from the small and presents reserves data according to operator production size classes. Table A6 lists the top U.S. operators by reported 2005 production.

Appendix B: Top 100 Oil and Gas Fields - What fields have the most reserves and production in the United States? The top 100 fields for oil and natural gas out of the inventory of more than 45,000 oil and gas fields are listed in Appendix B. These fields hold two-thirds of U.S. crude oil proved reserves.

Appendix C: Conversion to the Metric System - To simplify international comparisons, a summary of U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves expressed in metric units is included as Appendix C.

Appendix D: Historical Reserves Statistics - Appendix D contains selected historical reserves data presented at the National level. Readers interested in a historical look at one specific State or region can review these tables in an electronic data archive on the EIA website. Table D9 contains the production and proved reserves for 1995-2005 for the Gulf of Mexico Federal Offshore region by water depths greater than 200 meters, and less than 200 meters. Table D10 contains Nonproducing Reserves.

Appendix E: Summary of Data Collection Operations - This report is based on two annual EIA surveys. Proved reserves data is collected from U.S. oil and gas field operators on Form EIA-23. Natural gas liquids production data is collected annually from U.S. natural gas plant operators on Form EIA-64A. Appendix E describes survey designs, response statistics, reporting requirements, and sampling frame maintenance.

Appendix F: Statistical Considerations - The EIA strives to maintain or improve the accuracy of its reports. Since complete coverage of all oil and gas operators is impractical, the EIA has adopted sound statistical methods to impute data for those operators not sampled and for those data elements that smaller operators are not required to file. These methods are described in Appendix F.

Appendix G: Estimation of Reserves and Resources - Reserves are not measured directly. Reserves are estimated on the basis of the best geological, engineering, and economic data available to the estimator. Appendix G describes reserve estimation techniques commonly used by oil and gas field operators and EIA personnel when in the field performing quality assurance checks. A discussion of the relationship of reserves to overall U.S. oil and gas resources is also included.

Appendix H: Maps of Selected State Subdivisions - Certain large producing States have been subdivided into smaller regions to allow more specific reporting of reserves data. Maps of these States identifying the smaller regions are provided in Appendix H.

Appendix I: Annual Survey Forms of Domestic Oil and Gas Reserves - Samples of Form EIA-23 and Form EIA-64A are presented in Appendix I.

Glossary - Contains definitions of all of the technical terms used in this report.

3. Crude Oil Statistics

The United States had 21,757 million barrels of crude oil proved reserves as of December 31, 2005. Crude oil proved reserves rose for the first time in 3 years, increasing by 2 percent above the 2004 level. Reserves additions of crude oil in the United States replaced 122 percent of the 2005 production (**Figure 15**).

Boosted by reserves additions in many States, particularly Texas, Wyoming, Montana, Oklahoma, and California, the lower 48 States' crude oil proved reserves increased by 3 percent.

Despite significant new field discoveries in the Gulf of Mexico Federal Offshore and revision increases in Alaska, the proved reserves of these two areas declined in 2005 because reserves additions did not keep pace with production. The crude oil reserves of the Pacific Federal Offshore were revised downward in 2005. In August and September 2005, Hurricanes Katrina and Rita had major impacts on the Gulf Coast. The extensive storm damage to platforms, pipelines, and refining reduced U.S. annual oil production.

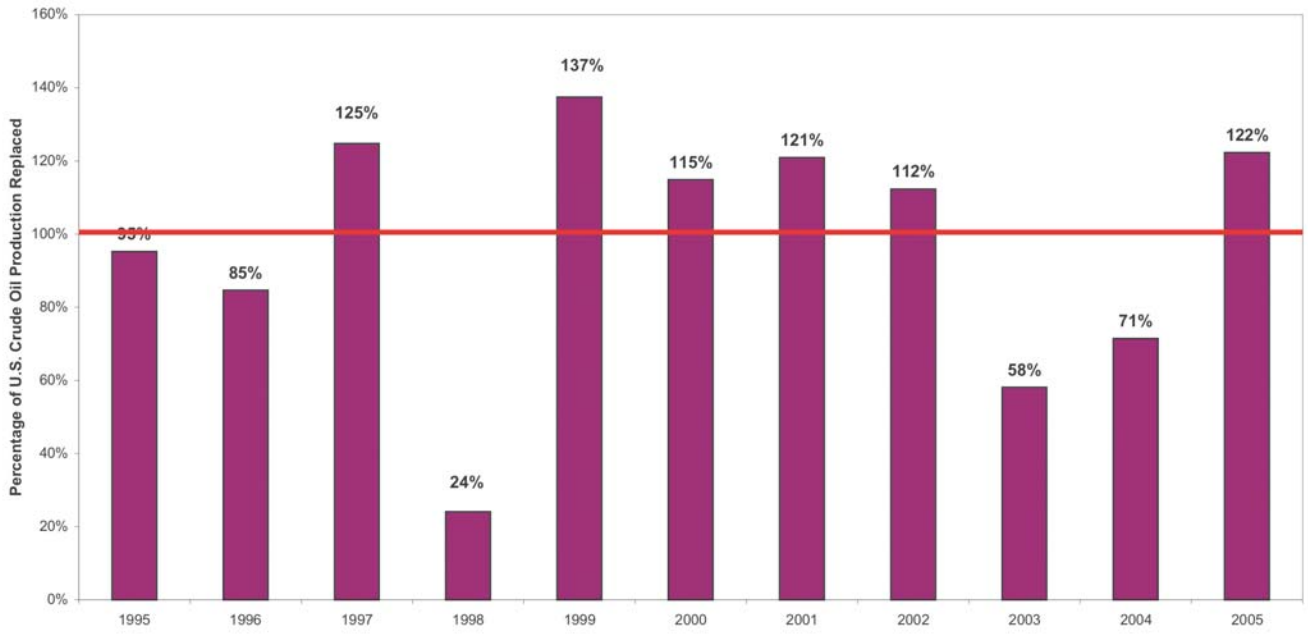
Proved Reserves

Table 6 presents the U.S. proved reserves of crude oil as of December 31, 2005, by selected States and State subdivisions.

Figure 16 maps 2005 crude oil proved reserves by area. The following four areas account for 77 percent of U.S. crude oil proved reserves:

Area	Percent of U.S. Oil Reserves
Texas	23
Alaska	19
Gulf of Mexico Federal Offshore	19
California	16
Area Total	**77**

Figure 15. Replacement of U.S. Crude Oil Production by Reserves Additions, 1995-2005.



Source: Energy Information Administration, Office of Oil and Gas.

Table 6. Crude Oil Proved Reserves, Reserves Changes, and Production, 2005
(Million Barrels of 42 U.S. Gallons)

State and Subdivision	Published Proved Reserves 12/31/04	Changes in Reserves During 2005: Adjustments (+,–)	Revision Increases (+)	Revision Decreases (–)	Sales (–)	Acquisitions (+)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (–)	Proved Reserves 12/31/05
Alaska	4,327	-2	188	86	37	37	56	0	0	312	4,171
Lower 48 States	**17,044**	**223**	**1,356**	**889**	**786**	**1,064**	**749**	**205**	**41**	**1,421**	**17,586**
Alabama	53	0	3	2	0	0	6	0	0	5	55
Arkansas	51	-5	3	3	5	4	0	0	0	5	40
California	3,376	16	177	70	4	23	147	0	0	230	3,435
Coastal Region Onshore	380	3	12	15	2	1	10	0	0	15	374
Los Angeles Basin Onshore	286	9	26	29	2	22	4	0	0	16	300
San Joaquin Basin Onshore	2,523	4	95	13	0	0	131	0	0	184	2,556
State Offshore	187	0	44	13	0	0	2	0	0	15	205
Colorado	225	-1	33	5	54	55	16	0	0	19	250
Florida	65	1	0	4	0	0	0	0	0	3	59
Illinois	92	10	3	1	0	1	0	0	0	10	95
Indiana	11	6	1	0	0	0	0	0	0	2	16
Kansas	245	32	44	18	1	4	6	0	2	33	281
Kentucky	27	-3	1	0	0	0	0	0	0	2	23
Louisiana	427	23	54	44	21	26	19	0	3	55	432
North	58	5	11	9	0	1	10	0	0	8	68
South Onshore	304	18	36	31	19	19	8	0	3	39	299
State Offshore	65	0	7	4	2	6	1	0	0	8	65
Michigan	53	1	7	1	0	0	7	0	0	5	62
Mississippi	178	2	25	8	1	11	0	0	0	18	189
Montana	364	-1	24	23	2	7	87	0	1	30	427
Nebraska	15	1	2	0	0	0	0	0	0	2	16
New Mexico	669	9	52	40	29	44	43	0	0	58	690
East	662	10	50	40	29	43	43	0	0	57	682
West	7	-1	2	0	0	1	0	0	0	1	8
North Dakota	389	-4	26	16	1	6	49	2	1	34	418
Ohio	49	-4	5	4	0	0	3	0	1	4	46
Oklahoma	570	54	86	61	71	80	22	0	1	51	630
Pennsylvania	12	3	1	2	0	0	2	0	0	2	14
Texas	4,613	64	455	229	520	723	163	2	3	355	4,919
RRC District 1	58	-1	5	3	0	2	12	0	1	9	65
RRC District 2 Onshore	56	2	5	2	2	3	7	0	0	7	62
RRC District 3 Onshore	185	-2	19	11	2	5	9	0	1	25	179
RRC District 4 Onshore	27	2	9	3	7	15	1	0	0	4	40
RRC District 5	23	3	5	3	7	7	0	0	0	4	24
RRC District 6	187	-1	6	12	2	1	4	0	0	15	168
RRC District 7B	73	13	6	4	1	1	1	0	0	9	80
RRC District 7C	206	6	16	10	56	63	36	1	0	17	245
RRC District 8	1,552	11	172	96	193	325	70	0	0	110	1,731
RRC District 8A	2,090	20	192	74	239	292	17	0	1	135	2,164
RRC District 9	102	12	10	7	8	5	2	1	0	14	103
RRC District 10	45	3	8	3	3	4	4	0	0	5	53
State Offshore	9	-4	2	1	0	0	0	0	0	1	5
Utah	215	7	65	35	0	0	19	0	0	15	256
West Virginia	11	4	7	0	0	0	0	0	0	1	21
Wyoming	628	8	28	17	35	56	81	0	0	45	704
Federal Offshore	4,691	0	253	305	42	24	68	201	29	436	4,483
Pacific (California)	547	-1	3	81	0	0	0	0	0	27	441
Gulf of Mexico (Louisiana)	3,919	1	206	198	25	23	55	199	14	342	3,852
Gulf of Mexico (Texas)	225	0	44	26	17	1	13	2	15	67	190
Miscellaneous[a]	15	0	1	1	0	0	11	0	0	1	25
U.S. Total	**21,371**	**221**	**1,544**	**975**	**823**	**1,101**	**805**	**205**	**41**	**1,733**	**21,757**

[a]Includes Arizona, Missouri, Nevada, New York, South Dakota, Tennessee, and Virginia.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves." They may differ from the official Energy Information Administration production data for crude oil for 2005 contained in the *Petroleum Supply Annual 2005*, DOE/EIA-0340(05).

Source: Energy Information Administration, Office of Oil and Gas.

Figure 16. Crude Oil Proved Reserves by Area, 2005

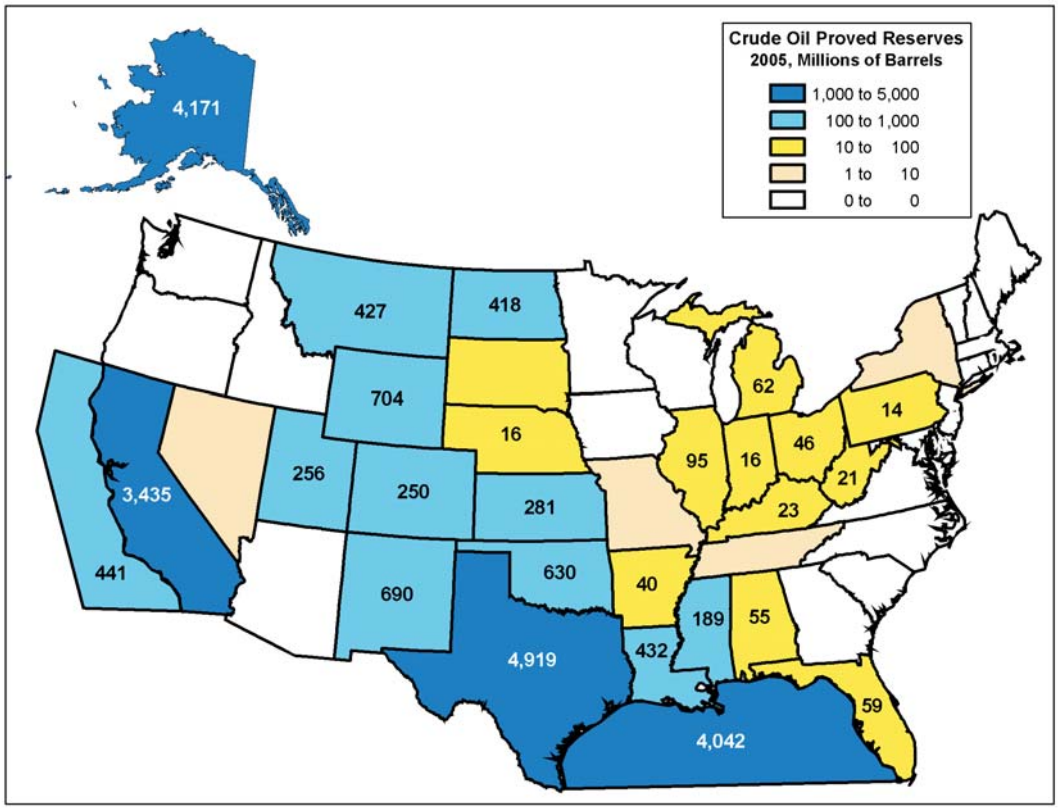
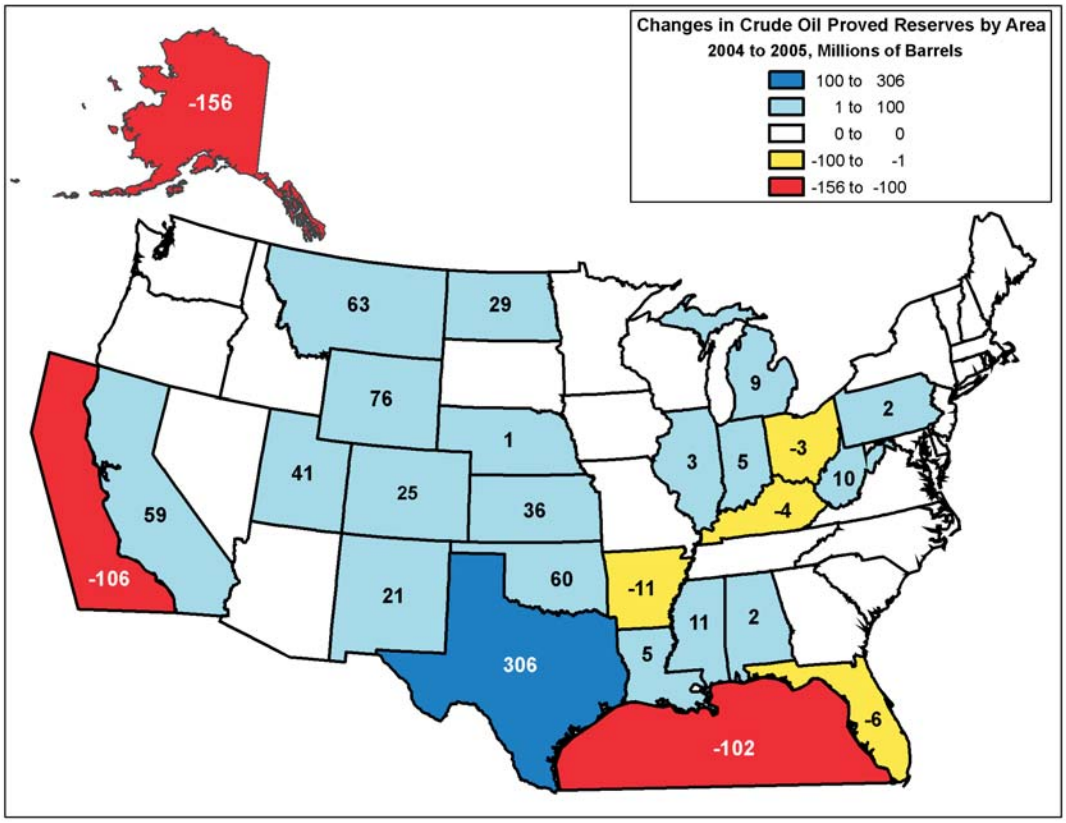


Figure 17. Changes in Crude Oil Proved Reserves by Area, 2004 to 2005



Source: Energy Information Administration, Office of Oil and Gas.

Discussion of Reserves Changes

Figure 17 maps the change in crude oil proved reserves from 2004 to 2005 by area. Here's how the top four areas fared compared to the total United States:

Area	Change in U.S. Oil Reserves (million barrels)
Texas	+306
Alaska	-156
Gulf of Mexico Federal Offshore	-102
California	+59
Area Total	**+107**
U.S. Total	**+386**

Texas had a 7 percent increase in crude oil proved reserves in 2005 and California had a 2 percent increase. The Gulf of Mexico reported a 2 percent decrease and Alaska declined 4 percent.

Figure 2 in Chapter 2 shows the components of the changes in crude oil proved reserves for 2005 and the preceding 10 years.

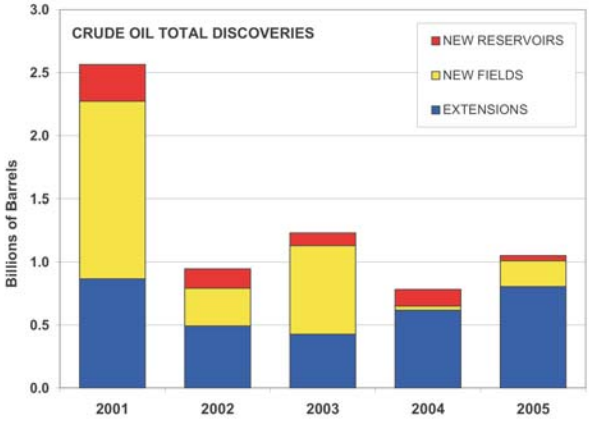
Total Discoveries

Total discoveries are those new reserves attributable to extensions of existing fields, new field discoveries, and new reservoir discoveries in old fields. They result from the drilling of exploratory wells.

Total discoveries of crude oil were 1,051 million barrels in 2005, 34 percent more than those of 2004(782 million barrels). Only seven areas had total discoveries exceeding 50 million barrels in 2005:

Area	Percent of U.S. Oil Total Discoveries
Federal Offshore Gulf of Mexico	28
Texas	16
California	14
Montana	8
Wyoming	8
Alaska	5
North Dakota	5
Area Total	**84**

The United States discovered an average of 1,126 million barrels of new crude oil proved reserves per year in the prior 10 years. Total discoveries in 2005 were 7 percent lower than that average.



Extensions

Operators reported 805 million barrels of extensions in 2005, 30 percent more than in 2004. The highest volume of extensions was reported in Texas (163 million barrels). The second highest volume of extensions in 2005 was in California with 147 million barrels. Montana was third with 87 million barrels and Wyoming was fourth with 81 million barrels of extensions.

In the prior 10 years, U.S. operators reported an average of 527 million barrels of extensions per year. The 2005 extensions were 53 percent more than that average.

New Field Discoveries

New field discoveries accounted for 205 million barrels of crude oil reserves additions. Almost all of these discoveries (201 of 205 million) were in the Gulf of Mexico Federal Offshore. This was 6 times greater than the new field discoveries of 2004.

In the prior 10 years, U.S. operators reported an annual average of 419 million barrels of reserves from new field discoveries. Reserves from new field discoveries in 2005 were 51 percent less than that average.

New Reservoir Discoveries in Old Fields

Operators reported 41 million barrels of crude oil reserves from new reservoir discoveries in old fields in 2005. This is 69 percent less than in 2004. Most of the new reservoir discoveries in old fields (29 of 41 million barrels) came from the Gulf of Mexico Federal Offshore.

In the prior 10 years, U.S. operators reported an annual average of 180 million barrels of reserves from new reservoir discoveries in old fields. Reserves from new reservoir discoveries in old fields in 2005 were 77 percent less than that average.

Revisions and Adjustments

Operators report thousands of positive and negative revisions to proved reserves each year as development wells are drilled, well performance is analyzed, new technology is applied, or economic conditions change. Adjustments are the annual changes in the published reserve estimates that cannot be directly attributed to the estimates for other reserve change categories because of the survey and statistical estimation methods employed.

There were 1,544 million barrels of revision increases, 975 million barrels of revision decreases, and 221 million barrels of adjustments in 2005. Combined, there were 790 million barrels of net revisions and adjustments for crude oil in 2004.

In the prior 10 years, net revisions and adjustments added an annual average of 795 million barrels. The 2005 net revisions and adjustments were 1 percent less than that average.

Sales and Acquisitions

Sales represents that volume of crude oil proved reserves deducted from an operator's total reserves by selling or transferring operations of existing oil fields or properties to another operator (not a volume of production "sold" at the wellhead). Similarly, acquisitions are that volume of proved reserves added to an operator's total reserves through purchase or operations transfer of an existing oil field or properties.

There are several reasons why sales and acquisitions volumes are not equal. Since operators have different engineering staffs and resources, or different development plans or schedules, the estimate of proved reserves for a field can change with a change in operatorship. Timing of the transfer of operations can also impact these values.

In 2005, there were 823 million barrels of sales transactions between operators and 1,101 million barrels of acquisitions yielding a net difference of +278 million barrels.

Production

U.S. production of crude oil in 2005 was an estimated 1,733 million barrels. This volume, which does not include lease condensate, was 5 percent lower than 2004's production of 1,819 million barrels.

In August and September 2005, hurricanes Katrina and Rita caused extensive damage on the Gulf Coast disrupted production operations in the Gulf of Mexico by damaging or destroying platforms, surface facilities, and pipelines. Crude oil production from the Gulf of Mexico Federal Offshore dropped 12 percent from 2004 to 2005. Despite this, the Gulf remained the largest producing area in the United States with 24 percent of the National total (409 million barrels of production). Texas and Alaska were second and third, with 20 and 18 percent of the National production total, respectively. California was fourth with 13 percent.

The 2005 Form EIA-23 National production estimates (1,733 million barrels of crude oil and 174 million barrels of lease condensate) are 1 percent higher than the comparable Petroleum Supply Annual (PSA) 2005 volumes for crude oil and lease condensate production combined (1,890 million barrels).

Areas of Note: Large Discoveries and Reserves Additions

The following State and area discussions summarize notable activities during 2005 concerning expected new field reserves, development plans, and possible production rates as reported in various trade publications. The citations do not necessarily reflect EIA's concurrence, but are considered important enough to be brought to the reader's attention.

The following areas were the major success stories for crude oil reserves and production for 2005.

Texas

Texas reported the largest increase (306 million barrels of proved oil reserves) in 2005 and had the largest volume of extensions in 2005 (163 million barrels). The majority of these extensions were to fields located in the Permian Basin.

- **SACROC and Yates Fields**: Kinder Morgan's carbon dioxide (CO_2) flooding operations increased oil production at both the SACROC and the Yates Fields in west Texas, which together have more than 5 billion barrels of oil

remaining in place. Kinder Morgan's CO_2 business produced over 56,000 barrels a day at SACROC and Yates in 2005. {40}

Wyoming

Wyoming reported a net increase of 76 million barrels of crude oil proved reserves in 2005. Wyoming's production also increased by 5 percent from 43 million barrels in 2004 to 45 million barrels in 2005.

- **Salt Creek Field**: Anadarko Petroleum Corporation has increased oil production at its Salt Creek Field using CO_2 injection for enhanced oil recovery. CO2 injection is predicted to boost Salt Creek's production from about 5,000 barrels a day now to 30,000 barrels a day by 2010. {41}

Montana

Montana reported a net increase of 63 million barrels of crude oil proved reserves in 2005. Montana's production also increased by 37 percent from 22 million barrels in 2004 to 30 million barrels in 2005.

- **Elm Coulee Field:** Montana reports that the Elm Coulee Field, which is completed in the middle member of the Bakken Formation, has doubled its oil production for the third year in a row in 2005. Discovered in 2000 and now grown to 529 square miles, the Elm Coulee Field produced 15 million barrels of oil in 2005. It now accounts for almost 50,000 barrels of oil per day, about half of Montana's crude oil production. {42}

Other Gain Areas

Oklahoma: Oklahoma reported a net increase of 60 million barrels of crude oil proved reserves in 2005.

California: California reported a net increase of 59 million barrels of crude oil proved reserves in 2005.

Areas of Note: Large Reserves Declines

The following areas had large declines in crude oil proved reserves due to downward revisions or unreplaced production.

Alaska

Alaskan crude oil proved reserves declined 4 percent (-156 million barrels) in 2005. No new field discoveries were reported in Alaska in 2005 and despite notable net revision increases in Alaska's proved reserves, the additions did not offset its oil production. Alaska's estimated 2005 production of 312 million barrels decreased 7 percent from the 2004 level (334 million barrels).

Pacific Federal Offshore

There was a 19 percent decline (-106 million barrels) in the crude oil proved reserves of the Pacific Federal Offshore in 2005. Crude oil reserves in 2005 were revised significantly downward. Crude oil production from this area declined 4 percent from its 2004 level.

Gulf of Mexico Federal Offshore

The Gulf of Mexico Federal Offshore crude oil proved reserves declined 2 percent (-102 million barrels) in 2005. Crude oil production declined 12 percent from 467 million barrels in 2004 to 409 million barrels in 2005, due to damaged platforms, pipelines, and surface facilities caused by the hurricanes of 2005.

Other Decline Areas

Discovery and development of new or existing oil fields was also outpaced by crude oil production in the following areas of the United States:

Arkansas: Proved oil reserves decreased by 22 percent (-11 million barrels).

Florida: Proved oil reserves decreased by 9 percent (-6 million barrels).

Reserves in Nonproducing Status

Not all proved reserves of crude oil reported in 2005 were producing. Operators reported 5,691 million barrels of proved reserves in nonproducing status, 11 percent more than reported in 2004 (5,143 million barrels). Nonproducing crude oil reserves (not including lease condensate) are listed in **Table 7**.

Nonproducing reserves are those awaiting well workovers, the drilling of extensions or additional development wells, installation of production or pipeline facilities, and depletion of other zones or reservoirs before recompletion in reservoirs not currently open to production.

Table 7. Reported Reserves in Nonproducing Status for Crude Oil, 2005 [a]

(Million Barrels of 42 U.S. Gallons)

State and Subdivision	Nonproducing Crude Oil Reserves
Alaska	595
Lower 48 States	**5,096**
Alabama	2
Arkansas	2
California	455
Coastal Region Onshore	70
Los Angeles Basin Onshore	112
San Joaquin Basin Onshore	238
State Offshore	35
Colorado	74
Florida	2
Kansas	16
Kentucky	5
Louisiana	193
North	17
South Onshore	148
State Offshore	28
Michigan	17
Mississippi	87
Montana	88
New Mexico	171
East	171
West	0
New York	0
North Dakota	56
Ohio	7
Oklahoma	101
Pennsylvania	0
Texas	828
RRC District 1	15
RRC District 2 Onshore	16
RRC District 3 Onshore	19
RRC District 4 Onshore	17
RRC District 5	1
RRC District 6	3
RRC District 7B	3
RRC District 7C	31
RRC District 8	333
RRC District 8A	374
RRC District 9	9
RRC District 10	6
State Offshore	1
Utah	52
Virginia	0
West Virginia	0
Wyoming	249
Federal Offshore	2,687
Pacific (California)	32
Gulf of Mexico (Louisiana)[c]	2,591
Gulf of Mexico (Texas)	64
Miscellaneous[b]	4
U.S. Total	**5,691**

[a] Includes only those operators who produced 400,000 barrels of crude oil or 2 billion cubic feet of natural gas, or both, during the report year (Category I or Category II operators).

[b] Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

[c] Includes Federal Offshore Alabama.

Source: Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," 2005.

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4. Natural Gas Statistics

Dry Natural Gas

Proved Reserves

The United States had 204,385 billion cubic feet of dry natural gas reserves as of December 31, 2005 (**Table 8**). Proved reserves of natural gas increased by 6 percent in 2005, the largest annual increase in natural gas proved reserves since 1970. All natural gas proved reserves data shown in this report exclude natural gas held in underground storage.

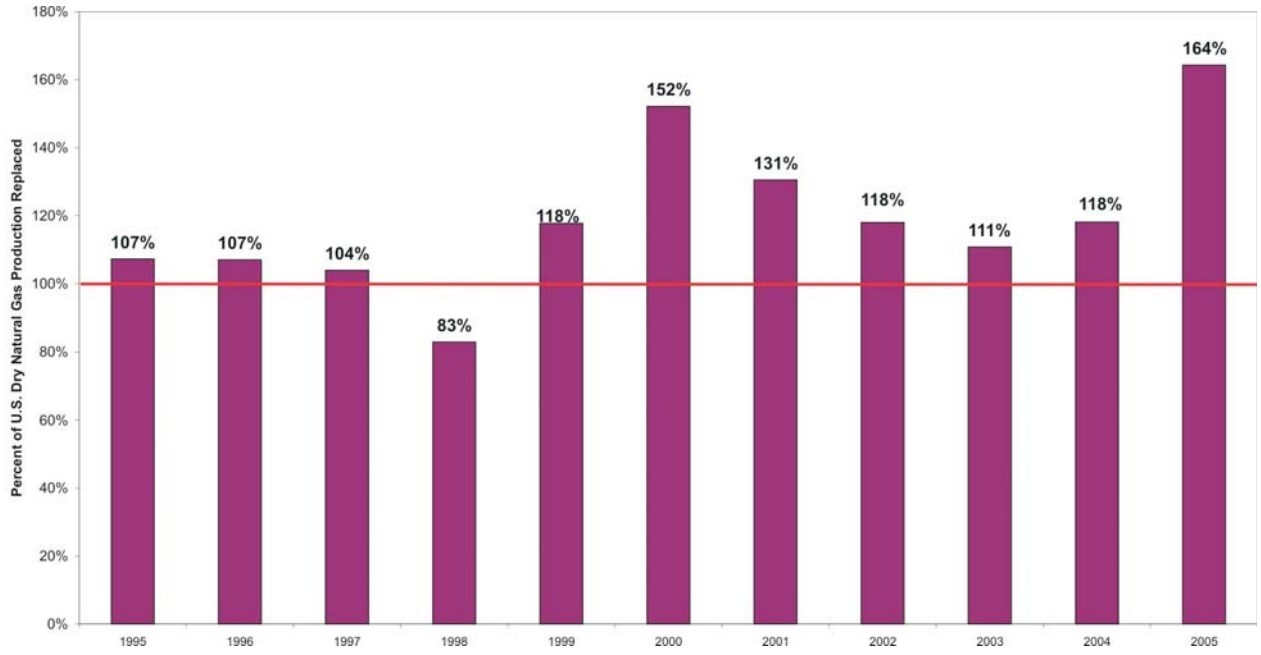
Gas reserves additions onshore in the lower 48 States were large enough to overcome a 10 percent drop in gas reserves reported for the Gulf of Mexico Federal Offshore. The majority of natural gas reserves additions in 2005 resulted from extensions of existing gas fields rather than new field or reservoir discoveries. Texas and Colorado led the nation in 2005 natural gas reserves additions with notable reserves increases in the Newark East Field (Barnett Shale, TX) and Ignacio-Blanco Field (tight sands and coalbeds, CO). Total U.S. reserves additions replaced 164 percent of 2005 dry gas production **(Figure 18)**.

The proved reserves by State are shown on the map in **Figure 19**. Seven areas account for 78 percent of the Nation's dry natural gas proved reserves:

Area	Percent of U.S. Gas Reserves
Texas	28
Wyoming	12
New Mexico	9
Oklahoma	8
Gulf of Mexico Federal Offshore	8
Colorado	8
Louisiana	5
Area Total	**78**

Total U.S. natural gas production declined 4 percent in 2005 because, in August and September of 2005, Hurricanes Katrina and Rita wreaked havoc along the Gulf Coast. Beyond devastating much of coastal Alabama, Louisiana, and Mississippi, and flooding

Figure 18. Replacement of U.S. Dry Natural Gas Production by Reserves Additions, 1995-2005.



Source: Energy Information Administration, Office of Oil and Gas.

Table 8. Dry Natural Gas Proved Reserves, Reserves Changes, and Production, 2005
(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/04	Changes in Reserves During 2005: Adjustments (+,–)	Revision Increases (+)	Revision Decreases (–)	Sales (–)	Acquisitions (+)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (–)	Proved Reserves 12/31/05
Alaska	8,285	-1	632	207	0	0	141	0	35	478	8,407
Lower 48 States	**180,759**	**-113**	**26,261**	**25,942**	**11,106**	**12,950**	**18,057**	**759**	**1,171**	**18,690**	**184,106**
Alabama	4,301	34	162	155	29	0	131	3	0	327	4,120
Arkansas	1,663	13	200	91	24	52	170	4	18	170	1,835
California	2,450	19	440	152	128	147	100	0	5	247	2,634
Coastal Region Onshore	167	-3	32	9	3	7	8	0	0	10	189
Los Angeles Basin Onshore	187	1	4	48	0	0	40	0	0	10	174
San Joaquin Basin Onshore	2,013	26	389	94	123	138	51	0	5	220	2,185
State Offshore	83	-5	15	1	2	2	1	0	0	7	86
Colorado	15,436	-55	1,505	2,167	2,528	2,397	1,017	171	17	1,050	14,743
Florida	79	3	0	1	0	0	0	0	0	3	78
Kansas	4,819	24	750	647	140	174	47	1	0	376	4,652
Kentucky	1,889	-40	176	153	5	0	96	0	0	83	1,880
Louisiana	9,325	-11	1,089	1,229	935	592	1,940	18	121	1,322	9,588
North	5,074	-12	348	417	588	281	1,521	5	11	453	5,770
South Onshore	3,745	60	629	681	281	250	392	9	83	770	3,436
State Offshore	506	-59	112	131	66	61	27	4	27	99	382
Michigan	3,428	-97	205	360	13	14	90	0	31	207	3,091
Mississippi	746	20	48	55	18	9	27	0	7	93	691
Montana	1,059	-56	73	124	3	3	131	1	6	95	995
New Mexico	17,020	126	2,757	1,771	682	1,323	1,243	20	3	1,527	18,512
East	3,301	80	646	467	263	434	383	20	3	516	3,621
West	13,719	46	2,111	1,304	419	889	860	0	0	1,011	14,891
New York	365	-93	81	75	12	15	87	0	0	44	[a]324
North Dakota	448	-29	86	57	11	22	7	0	2	51	417
Ohio	1,126	-138	103	64	0	0	29	0	0	82	974
Oklahoma	15,401	-113	2,173	1,912	511	763	1,983	8	9	1,563	16,238
Pennsylvania	2,487	-188	657	567	28	29	123	0	3	155	2,361
Texas	45,730	674	7,442	6,397	2,780	4,137	5,891	264	312	5,318	49,955
RRC District 1	1,062	57	111	128	82	91	92	100	1	120	1,184
RRC District 2 Onshore	1,770	3	272	343	154	283	262	13	34	296	1,844
RRC District 3 Onshore	3,349	175	704	901	201	176	344	58	63	582	3,185
RRC District 4 Onshore	8,763	43	1,248	1,531	547	774	1,157	7	80	1,295	8,699
RRC District 5	5,407	68	1,068	421	295	622	509	7	48	490	6,523
RRC District 6	6,685	92	891	663	207	481	946	18	78	683	7,638
RRC District 7B	340	52	23	64	19	22	7	0	0	51	310
RRC District 7C	4,327	-21	829	458	271	293	316	0	1	348	4,668
RRC District 8	5,142	7	697	730	269	372	527	44	4	493	5,301
RRC District 8A	1,056	-4	234	37	17	46	14	4	0	108	1,188
RRC District 9	3,309	14	423	210	517	552	1,062	0	0	412	4,221
RRC District 10	4,064	184	777	705	74	345	654	3	0	375	4,873
State Offshore	456	4	165	206	127	80	1	10	3	65	321
Utah	3,516	113	475	278	946	953	299	5	11	282	3,866
Virginia	1,717	-19	39	69	0	0	146	0	0	72	1,742
West Virginia	3,306	-287	664	256	71	25	185	0	1	170	3,397
Wyoming	21,744	50	2,853	3,586	865	811	3,105	8	36	1,524	22,632
Federal Offshore[b]	22,570	-61	4,276	5,734	1,375	1,482	1,193	252	589	3,921	19,271
Pacific (California)	511	0	22	17	113	103	0	0	0	47	459
Gulf of Mexico (Louisiana)[b]	16,728	-85	2,034	3,201	998	1,177	1,110	208	514	2,802	14,685
Gulf of Mexico (Texas)	5,331	24	2,220	2,516	264	202	83	44	75	1,072	4,127
Miscellaneous[c]	134	-2	7	42	2	2	17	4	0	8	110
U.S. Total	**189,044**	**-114**	**26,893**	**26,149**	**11,106**	**12,950**	**18,198**	**759**	**1,206**	**19,168**	**192,513**

[a]Indicates the estimate is associated with a sampling error (95 percent confidence interval) that exceeds 20 percent of the estimated value.
[b]Includes Federal offshore Alabama.
[c]Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," and Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production." They may differ from the official Energy Information Administration production data for natural gas for 2005 contained in the *Natural Gas Annual 2005*, DOE/EIA-0131(05).

Source: Energy Information Administration, Office of Oil and Gas.

Figure 19. Dry Natural Gas Proved Reserves by Area, 2005

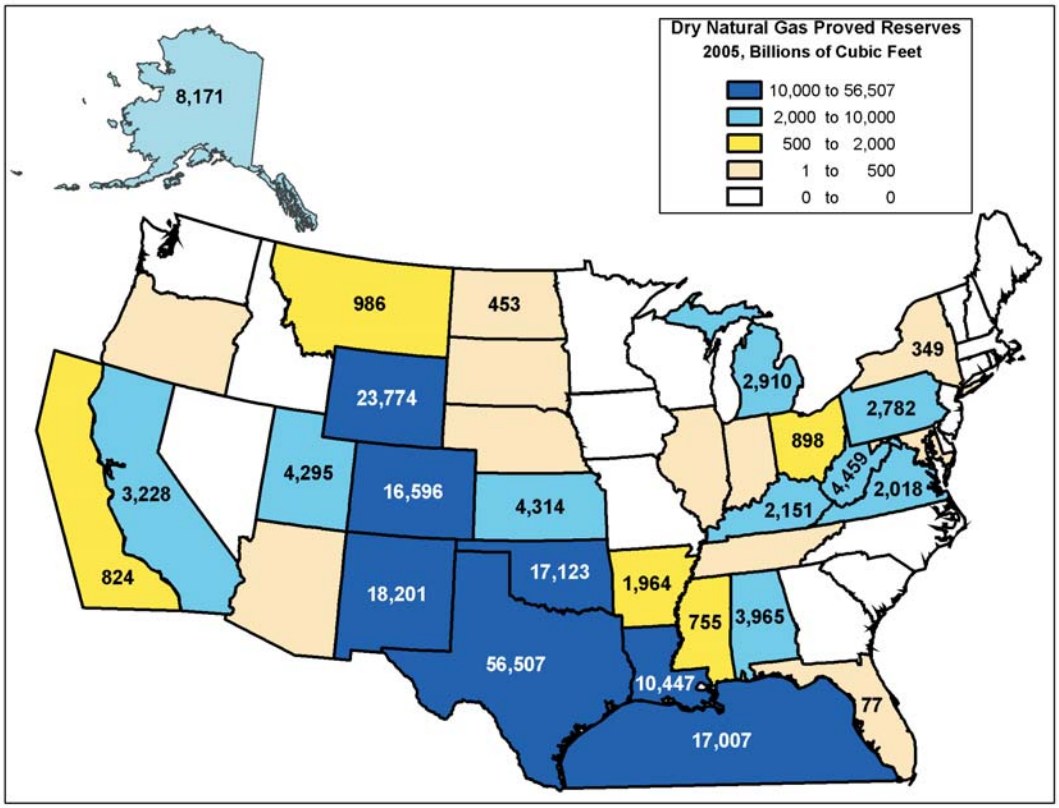
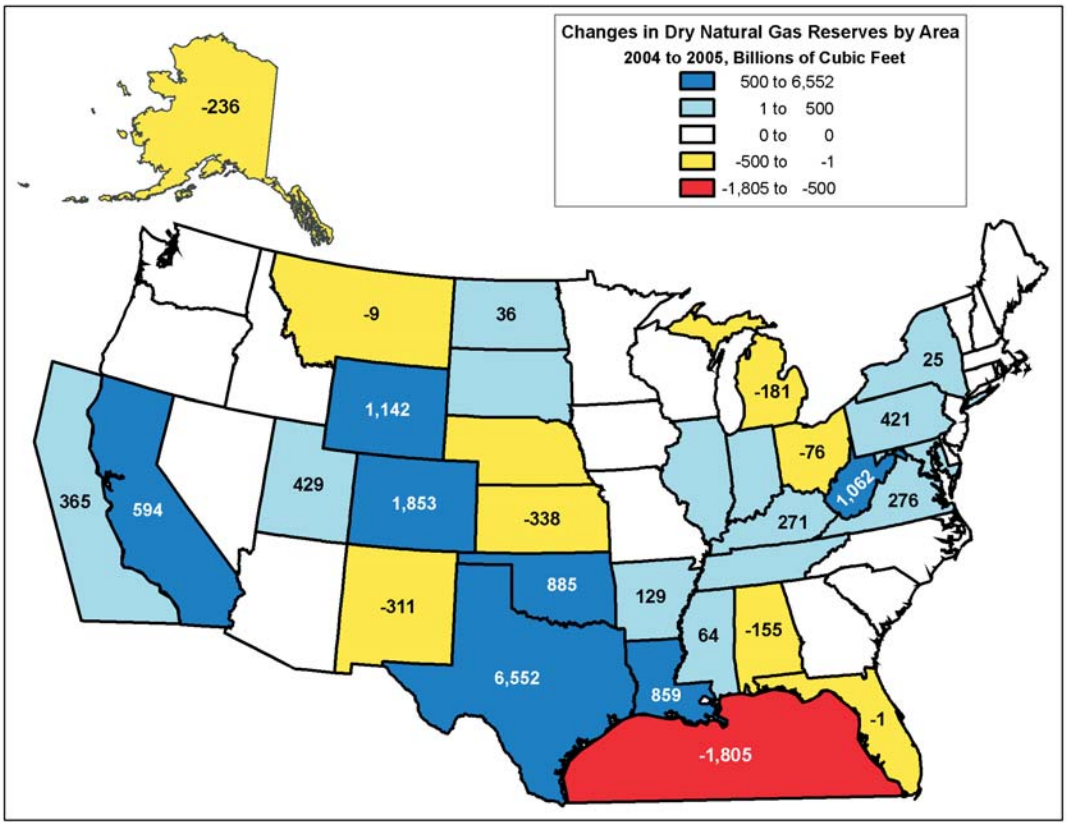


Figure 20. Changes in Dry Natural Gas Proved Reserves by Area, 2004 to 2005



Source: Energy Information Administration, Office of Oil and Gas.

New Orleans, these storms destroyed 113 offshore platforms and seriously damaged offshore pipelines and coastal oil and natural gas processing facilities, impacting the Nation's oil and gas production. At its lowest point, the natural gas production rate in the Gulf of Mexico was cut by 80 percent. Gulf of Mexico production slowly returned and reached roughly 80 percent of 2005's pre-hurricane production rate (10.2 Bcf/day gross withdrawal in June 2005) in September 2006.

Discussion of Reserves Changes

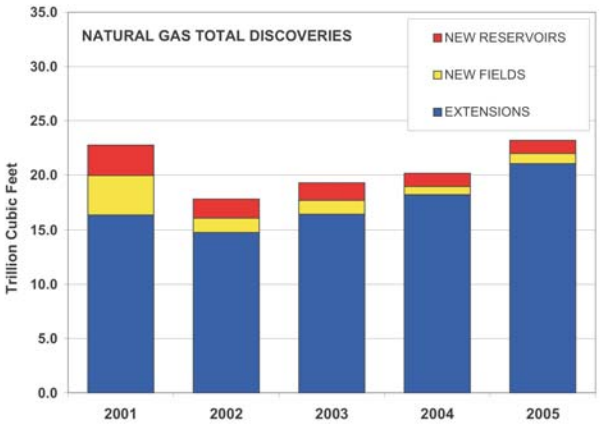
Figure 20 maps the change in dry gas proved reserves from 2004 to 2005 by area. Here's how the top six areas fared, compared to the total United States:

Area	Change in U.S. Gas Reserves (billion cubic feet)
Texas	+6,552
Wyoming	+1,142
New Mexico	-311
Oklahoma	+885
Gulf of Mexico Federal Offshore	-1,805
Colorado	+1,853
Area Total	**+8,316**
U.S. Total	**+11,872**

Figure 4 in Chapter 2 shows the components of change in dry natural gas proved reserves for 2005 and the preceding 10 years.

Total Discoveries

Total discoveries are those reserves attributable to field extensions, new field discoveries, and new reservoir discoveries in old fields; they result from drilling exploratory wells.



Total discoveries of dry natural gas reserves were 23,200 billion cubic feet in 2005, a 15 percent increase from the level reported in 2004. Seven areas reported total discoveries of dry natural gas exceeding 1 trillion cubic feet in 2005:

Area	2005 Total Discoveries (Billion cubic feet)
Texas	10,118
Wyoming	2,000
Oklahoma	1,867
Colorado	1,831
Gulf of Mexico Federal Offshore	1,820
Louisiana	1,754
New Mexico	1,061
U.S. Total	**23,200**

Extensions

The largest component of total discoveries in 2005 was extensions of existing gas fields. Extensions were 21,050 billion cubic feet, 16 percent more than 2004 and 74 percent more than the prior 10-year average (12,101 billion cubic feet). Areas with the largest extensions and their percentage of total extensions were:

Area	Percent of 2005 Extensions
Texas	46
Wyoming	9
Oklahoma	9
Colorado	9
Louisiana	7
New Mexico	5
Gulf of Mexico	3

New Field Discoveries

New field discoveries were 942 billion cubic feet in 2005—24 percent more than in 2004. The areas with the largest new field discoveries were the Gulf of Mexico Federal Offshore (632 billion cubic feet; 67 percent of the total), Texas (138 billion cubic feet; 15 percent), Colorado (32 billion cubic feet; 3 percent) and Alaska (22 billion cubic feet; 2 percent). In the prior 10 years, U.S. operators had reported an annual average of 1,731 billion cubic feet of reserves from new field discoveries. Reserves from new field discoveries in 2005 were 46 percent less than the prior 10 year average.

Table 9. Natural Gas Proved Reserves, Reserves Changes, and Production, Wet After Lease Separation, 2005 (Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/04	Changes in Reserves During 2005: Adjustments (+,–)	Revision Increases (+)	Revision Decreases (–)	Sales (–)	Acquisitions (+)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (–)	Proved Reserves 12/31/05
Alaska	8,473	-1	295	155	96	98	62	22	10	471	8,237
Lower 48 States	**192,727**	**1,694**	**23,067**	**20,492**	**9,536**	**12,208**	**22,007**	**951**	**1,233**	**18,788**	**205,071**
Alabama	4,159	-25	137	61	427	439	87	0	0	303	4,006
Arkansas	1,837	8	122	142	31	30	282	4	31	174	1,967
California	2,773	69	777	136	212	256	135	0	3	281	3,384
Coastal Region Onshore	196	72	33	13	0	1	6	0	0	18	277
Los Angeles Basin Onshore	184	1	11	18	1	16	2	0	0	9	186
San Joaquin Basin Onshore	2,306	-3	720	102	211	239	126	0	3	247	2,831
State Offshore	87	-1	13	3	0	0	1	0	0	7	90
Colorado	15,249	21	2,082	1,525	1,278	1,824	1,851	33	4	1,139	17,122
Florida	88	2	0	0	0	0	0	0	0	3	87
Kansas	5,003	50	220	406	47	64	115	0	4	405	4,598
Kentucky	1,982	43	262	81	1	0	106	18	0	89	2,240
Louisiana	9,792	156	903	878	231	389	1,589	6	195	1,242	10,679
North	5,841	60	341	254	71	142	1,201	0	11	503	6,768
South Onshore	3,557	63	506	579	127	217	358	6	145	668	3,478
State Offshore	394	33	56	45	33	30	30	0	39	71	433
Michigan	3,154	-8	144	166	106	91	56	11	0	215	2,961
Mississippi	692	7	57	27	17	54	75	0	3	86	758
Montana	1,002	8	64	123	6	9	131	0	14	101	998
New Mexico	19,687	28	2,201	2,409	1,035	1,330	1,123	10	3	1,594	19,344
East	3,965	23	498	449	561	708	510	5	2	569	4,132
West	15,722	5	1,703	1,960	474	622	613	5	1	1,025	15,212
New York	324	17	51	20	1	2	7	20	0	51	349
North Dakota	465	-8	55	31	1	24	56	5	2	59	508
Ohio	975	-79	166	111	54	7	58	5	7	76	898
Oklahoma	17,200	324	3,247	3,121	572	772	1,926	1	51	1,682	18,146
Pennsylvania	2,371	187	234	155	78	139	276	0	0	181	2,793
Texas	53,275	602	6,388	6,055	4,396	5,382	10,244	149	350	5,761	60,178
RRC District 1	1,229	27	73	136	65	79	119	0	12	133	1,205
RRC District 2 Onshore	1,934	164	197	273	217	267	355	28	40	320	2,175
RRC District 3 Onshore	3,400	67	510	568	98	118	459	67	47	596	3,406
RRC District 4 Onshore	9,067	29	1,163	1,164	872	1,014	1,059	22	66	1,280	9,104
RRC District 5	6,583	71	1,223	400	350	350	2,624	0	164	654	9,611
RRC District 6	7,966	99	570	560	497	1,056	1,476	9	7	783	9,343
RRC District 7B	364	-42	164	59	26	141	465	0	1	76	932
RRC District 7C	5,190	93	450	543	307	314	883	10	0	388	5,702
RRC District 8	6,002	44	527	786	488	753	1,263	12	0	527	6,800
RRC District 8A	1,281	24	202	82	125	250	29	1	1	110	1,471
RRC District 9	4,555	5	487	768	334	424	760	0	0	395	4,734
RRC District 10	5,383	4	787	681	988	612	752	0	0	439	5,430
State Offshore	321	17	35	35	29	4	0	0	12	60	265
Utah	3,951	38	189	114	6	0	605	4	5	313	4,359
Virginia	1,742	18	163	3	1	3	166	0	0	70	2,018
West Virginia	3,509	192	662	77	6	135	381	11	0	235	4,572
Wyoming	23,640	15	2,246	1,895	145	489	2,066	11	3	1,708	24,722
Federal Offshore[a]	19,747	5	2,689	2,938	885	769	660	649	558	3,002	18,252
Pacific (California)	459	1	418	19	0	0	0	0	0	34	825
Gulf of Mexico (Louisiana)[a]	15,144	1	1,450	1,960	738	647	563	636	386	2,056	14,073
Gulf of Mexico (Texas)	4,144	3	821	959	147	122	97	13	172	912	3,354
Miscellaneous[b]	110	24	8	18	0	0	12	14	0	18	132
U.S. Total	**201,200**	**1,693**	**23,362**	**20,647**	**9,632**	**12,306**	**22,069**	**973**	**1,243**	**19,259**	**213,308**

[a]Includes Federal offshore Alabama.
[b]Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Note: The prouction estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves." They may differ from the official Energy Information Administration production data for natural gas for 2005 contained in the *Natural Gas Annual 2005,* DOE/EIA-0131(05).

Source: Energy Information Administration, Office of Oil and Gas.

Table 10. Nonassociated Natural Gas Proved Reserves, Reserves Changes, and Production, Wet After Lease Separation, 2005 (Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/04	Changes in Reserves During 2005: Adjustments (+,–)	Revision Increases (+)	Revision Decreases (–)	Sales (–)	Acquisitions (+)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (–)	Proved Reserves 12/31/05
Alaska	2,004	-1	116	129	74	79	61	22	10	213	1,875
Lower 48 States	**171,547**	**1,568**	**19,965**	**18,484**	**7,903**	**10,156**	**20,976**	**832**	**1,154**	**16,614**	**183,197**
Alabama	4,127	-21	133	60	427	439	84	0	0	298	3,977
Arkansas	1,797	11	121	141	15	3	281	4	31	171	1,921
California	767	-4	66	60	211	239	84	0	3	85	799
Coastal Region Onshore	8	-1	1	0	0	0	0	0	0	0	8
Los Angeles Basin Onshore	0	0	0	0	0	0	0	0	0	0	0
San Joaquin Basin Onshore	757	-3	65	60	211	239	84	0	3	84	790
State Offshore	2	0	0	0	0	0	0	0	0	1	1
Colorado	13,956	13	2,065	1,499	587	1,123	1,736	33	4	1,048	15,796
Florida	0	0	0	0	0	0	0	0	0	0	0
Kansas	4,923	50	208	401	47	61	113	0	4	396	4,515
Kentucky	1,963	43	246	73	1	0	102	18	0	88	2,210
Louisiana	9,235	100	787	799	187	355	1,570	6	191	1,167	10,091
North	5,734	49	333	232	70	141	1,197	0	11	493	6,670
South Onshore	3,168	21	405	526	90	192	345	6	141	611	3,051
State Offshore	333	30	49	41	27	22	28	0	39	63	370
Michigan	2,961	1	136	142	106	91	54	11	0	198	2,808
Mississippi	672	6	53	25	16	54	74	0	3	83	738
Montana	872	8	44	109	5	7	92	0	14	86	837
New Mexico	18,109	48	1,975	2,287	906	1,171	943	10	3	1,383	17,683
East	2,477	42	288	329	436	554	333	5	2	367	2,569
West	15,632	6	1,687	1,958	470	617	610	5	1	1,016	15,114
New York	324	14	51	20	1	2	7	20	0	51	346
North Dakota	145	7	6	6	0	20	10	0	1	18	165
Ohio	767	-49	143	102	54	7	58	5	0	61	714
Oklahoma	16,301	364	3,070	2,937	514	694	1,878	1	50	1,570	17,337
Pennsylvania	2,246	180	228	143	78	139	259	0	0	172	2,659
Texas	46,728	517	5,612	5,549	3,821	4,525	9,817	147	345	5,146	53,175
RRC District 1	1,184	27	67	134	64	78	105	0	11	126	1,148
RRC District 2 Onshore	1,858	165	158	249	214	260	319	28	39	298	2,066
RRC District 3 Onshore	2,959	63	453	530	93	109	412	66	45	523	2,961
RRC District 4 Onshore	8,902	30	1,136	1,145	850	1,003	1,054	22	66	1,262	8,956
RRC District 5	6,525	70	1,218	394	345	347	2,623	0	164	648	9,560
RRC District 6	7,564	86	543	511	497	1,052	1,471	9	7	725	8,999
RRC District 7B	288	-42	158	52	25	138	457	0	1	64	859
RRC District 7C	4,196	83	362	458	117	136	772	9	0	318	4,665
RRC District 8	3,266	-6	253	568	321	381	1,134	12	0	322	3,829
RRC District 8A	95	14	13	52	3	2	27	1	0	12	85
RRC District 9	4,445	-8	474	759	324	405	751	0	0	376	4,608
RRC District 10	5,134	17	744	664	942	610	692	0	0	414	5,177
State Offshore	312	18	33	33	26	4	0	0	12	58	262
Utah	3,661	33	134	80	6	0	590	0	5	286	4,051
Virginia	1,742	18	163	3	1	3	166	0	0	70	2,018
West Virginia	3,489	192	661	75	6	135	380	11	0	234	4,553
Wyoming	23,278	16	2,200	1,864	127	407	2,062	11	3	1,648	24,338
Federal Offshore[a]	13,386	4	1,855	2,095	787	681	614	541	497	2,348	12,348
Pacific (California)	47	1	2	0	0	0	0	0	0	1	49
Gulf of Mexico (Louisiana)[a]	10,081	1	1,149	1,443	657	566	523	532	347	1,607	9,492
Gulf of Mexico (Texas)	3,258	2	704	652	130	115	91	9	150	740	2,807
Miscellaneous[b]	98	17	8	14	0	0	2	14	0	7	118
U.S. Total	**173,551**	**1,567**	**20,081**	**18,613**	**7,977**	**10,235**	**21,037**	**854**	**1,164**	**16,827**	**185,072**

[a]Includes Federal offshore Alabama.
[b]Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.
Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves." They may differ from the official Energy Information Administration production data for natural gas for 2005 contained in the *Natural Gas Annual 2005,* DOE/EIA-0131(05).
Source: Energy Information Administration, Office of Oil and Gas.

Table 11. Associated-Dissolved Natural Gas Proved Reserves, Reserves Changes, and Production, Wet After Lease Separation, 2005 (Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

State and Subdivision	Published Proved Reserves 12/31/04	Changes in Reserves During 2005: Adjustments (+,–)	Revision Increases (+)	Revision Decreases (–)	Sales (–)	Acquisitions (+)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (–)	Proved Reserves 12/31/05
Alaska	6,469	0	179	26	22	19	1	0	0	258	6,362
Lower 48 States	**21,180**	**126**	**3,102**	**2,008**	**1,633**	**2,052**	**1,031**	**119**	**79**	**2,174**	**21,874**
Alabama	32	-4	4	1	0	0	3	0	0	5	29
Arkansas	40	-3	1	1	16	27	1	0	0	3	46
California	2,006	73	711	76	1	17	51	0	0	196	2,585
Coastal Region Onshore	188	73	32	13	0	1	6	0	0	18	269
Los Angeles Basin Onshore	184	1	11	18	1	16	2	0	0	9	186
San Joaquin Basin Onshore	1,549	0	655	42	0	0	42	0	0	163	2,041
State Offshore	85	-1	13	3	0	0	1	0	0	6	89
Colorado	1,293	8	17	26	691	701	115	0	0	91	1,326
Florida	88	2	0	0	0	0	0	0	0	3	87
Kansas	80	0	12	5	0	3	2	0	0	9	83
Kentucky	19	0	16	8	0	0	4	0	0	1	30
Louisiana	557	56	116	79	44	34	19	0	4	75	588
North	107	11	8	22	1	1	4	0	0	10	98
South Onshore	389	42	101	53	37	25	13	0	4	57	427
State Offshore	61	3	7	4	6	8	2	0	0	8	63
Michigan	193	-9	8	24	0	0	2	0	0	17	153
Mississippi	20	1	4	2	1	0	1	0	0	3	20
Montana	130	0	20	14	1	2	39	0	0	15	161
New Mexico	1,578	-20	226	122	129	159	180	0	0	211	1,661
East	1,488	-19	210	120	125	154	177	0	0	202	1,563
West	90	-1	16	2	4	5	3	0	0	9	98
New York	0	3	0	0	0	0	0	0	0	0	3
North Dakota	320	-15	49	25	1	4	46	5	1	41	343
Ohio	208	-30	23	9	0	0	0	0	7	15	184
Oklahoma	899	-40	177	184	58	78	48	0	1	112	809
Pennsylvania	125	7	6	12	0	0	17	0	0	9	134
Texas	6,547	85	776	506	575	857	427	2	5	615	7,003
RRC District 1	45	0	6	2	1	1	14	0	1	7	57
RRC District 2 Onshore	76	-1	39	24	3	7	36	0	1	22	109
RRC District 3 Onshore	441	4	57	38	5	9	47	1	2	73	445
RRC District 4 Onshore	165	-1	27	19	22	11	5	0	0	18	148
RRC District 5	58	1	5	6	5	3	1	0	0	6	51
RRC District 6	402	13	27	49	0	4	5	0	0	58	344
RRC District 7B	76	0	6	7	1	3	8	0	0	12	73
RRC District 7C	994	10	88	85	190	178	111	1	0	70	1,037
RRC District 8	2,736	50	274	218	167	372	129	0	0	205	2,971
RRC District 8A	1,186	10	189	30	122	248	2	0	1	98	1,386
RRC District 9	110	13	13	9	10	19	9	0	0	19	126
RRC District 10	249	-13	43	17	46	2	60	0	0	25	253
State Offshore	9	-1	2	2	3	0	0	0	0	2	3
Utah	290	5	55	34	0	0	15	4	0	27	308
Virginia	0	0	0	0	0	0	0	0	0	0	0
West Virginia	20	0	1	2	0	0	1	0	0	1	19
Wyoming	362	-1	46	31	18	82	4	0	0	60	384
Federal Offshore[a]	6,361	1	834	843	98	88	46	108	61	654	5,904
Pacific (California)	412	0	416	19	0	0	0	0	0	33	776
Gulf of Mexico (Louisiana)[a]	5,063	0	301	517	81	81	40	104	39	449	4,581
Gulf of Mexico (Texas)	886	1	117	307	17	7	6	4	22	172	547
Miscellaneous[b]	12	7	0	4	0	0	10	0	0	11	14
U.S. Total	**27,649**	**126**	**3,281**	**2,034**	**1,655**	**2,071**	**1,032**	**119**	**79**	**2,432**	**28,236**

[a]Includes Federal offshore Alabama.
[b]Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves." They may differ from the official Energy Information Administration production data for natural gas for 2005 contained in the *Natural Gas Annual 2005*, DOE/EIA-0131(05).

Source: Energy Information Administration, Office of Oil and Gas.

New Reservoir Discoveries in Old Fields

New reservoir discoveries in old fields were 1,208 billion cubic feet, less than 1 percent more than 2004 (1,206 billion cubic feet). The areas with the largest new reservoir discoveries in old fields and their percentage of the total were Gulf of Mexico Federal Offshore (546 billion cubic feet; 45 percent of the total), Texas (340 billion cubic feet; 28 percent of the total), and Louisiana (188 billion cubic feet; 16 percent of the total).

In the prior 10 years, U.S. operators had reported an annual average of 2,198 billion cubic feet of reserves from new reservoirs discovered in old fields. Reserves from new reservoirs discovered in old fields in 2005 were 45 percent less than that average.

Revisions and Adjustments

There were 22,353 billion cubic feet of revision increases, 19,654 billion cubic feet of revision decreases, and 1,887 billion cubic feet of adjustments in 2005. Combined, there were 4,586 billion cubic feet of net revisions and adjustments in 2005, excluding reserves additions from net sales and acquisitions. This is 7 percent less than the average volume of net revisions and adjustments of the prior 10 years (4,908 billion cubic feet).

Sales and Acquisitions

Sales represents that volume of dry natural gas proved reserves deducted from an operator's total reserves through sale or transfer of operations of an existing gas field or property to another operator (not a volume of production "sold" at the wellhead). Similarly, acquisitions are that volume of proved reserves added to an operator's total reserves by purchase or transfer of operations of an existing gas field or property.

There are several reasons why sales and acquisitions volumes are not equal. Since operators have different engineering staffs and resources, or different development plans or schedules, the estimate of proved reserves for a field can change with a change in operatorship. Timing of the transfer of operations can also impact these values.

In 2005, there were 9,130 billion cubic feet of sales transactions between operators, and 11,674 billion cubic feet of acquisitions. The net difference of 2,544 billion cubic feet was added to the National total of dry natural gas reserves in 2005.

Production

The estimated 2005 U.S. dry natural gas production was 18,458 billion cubic feet (**Table 8**), a decrease of 4 percent from 2004 (19,168 billion cubic feet). Areas with the largest production and their percentage of total production were:

Area	Percent of 2005 U.S. Dry Gas Production
Texas	29
Gulf of Mexico Federal Offshore	16
Wyoming	9
Oklahoma	9
New Mexico	8
Louisiana	7
Colorado	6

Wet Natural Gas

U. S. proved reserves of wet natural gas as of December 31, 2004 were 213,308 billion cubic feet, a 6 percent increase over the volume reported in 2004 (**Table 9**). At year-end 2005, proved wet natural gas reserves for the lower 48 States had increased by 6 percent compared to 2004, while those of Alaska had decreased by 3 percent.

The volumetric differences between the estimates reported in **Table 8** (dry) and **Table 9** (wet) result from the removal of natural gas liquids at natural gas processing plants. A discussion of the methodology used to generate wet and dry natural gas reserves tables in this report appears in Appendix F.

Nonassociated Natural Gas

Proved Reserves

Proved reserves of nonassociated (NA) natural gas, wet after lease separation, in the United States increased by 7 percent (11,521 billion cubic feet) in 2005 to 185,072 billion cubic feet (**Table 10**). The lower 48 States' NA wet natural gas proved reserves increased 7 percent to a level of 183,197 billion cubic feet, while Alaska had a 6 percent decline to a level of 1,875 billion cubic feet.

Seven areas accounted for 82 percent of U.S. NA natural gas proved reserves in 2005:

Area	Percent of 2005 U.S. NA Gas Reserves
Texas	29
Wyoming	13
New Mexico	10
Oklahoma	9
Colorado	9
Gulf of Mexico Federal Offshore	7
Louisiana	5
Area Total	**82**

Total Discoveries

NA wet natural gas *total discoveries* of 23,055 billion cubic feet in 2005 were 15 percent more than the 2004 total of 20,064 billion cubic feet. Areas with the most *total discoveries* of nonassociated natural gas in 2005 were Texas (10,309 billion cubic feet), Wyoming (2,076 billion cubic feet), Oklahoma (1,929 billion cubic feet), Colorado (1,773 billion cubic feet), Louisiana (1,767 billion cubic feet), and the Gulf of Mexico Federal Offshore (1,652 billion cubic feet).

Production

U.S. production of NA wet natural gas decreased 3 percent from an estimated 17,275 billion cubic feet in 2004 to 16,827 billion cubic feet in 2005. The leading producing areas were: Texas (31 percent), the Gulf of Mexico Federal Offshore (14 percent), Wyoming (10 percent), Oklahoma (9 percent), New Mexico (8 percent), Louisiana (7 percent), and Colorado (6 percent).

Associated-Dissolved Natural Gas

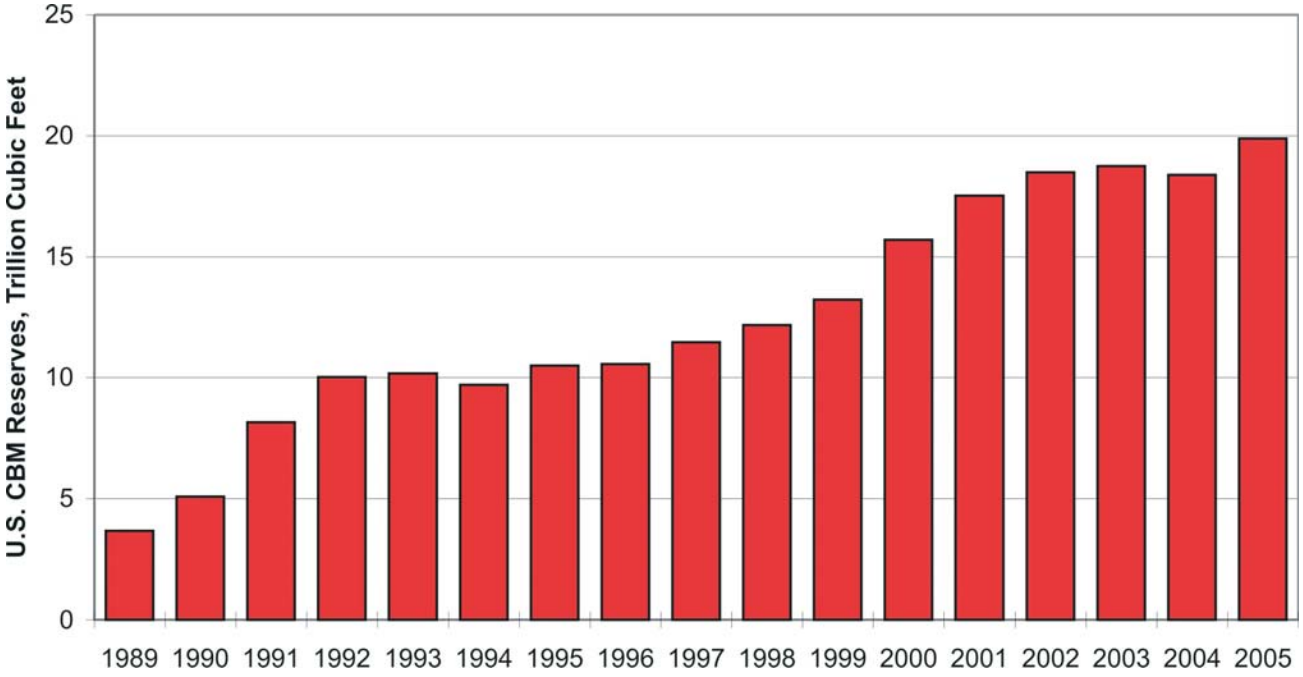
Proved Reserves

Proved reserves of associated-dissolved (AD) natural gas, wet after lease separation, in the United States increased 2 percent to 28,236 billion cubic feet in 2005 (**Table 11**). Proved reserves of AD wet natural gas in the lower 48 States increased by 3 percent to 21,874 billion cubic feet, and in Alaska decreased 2 percent to 6,362 billion cubic feet. The areas of the country with the largest AD wet natural gas reserves and their percentage of the total were:

Area	Percent of 2005 U.S. AD Gas Reserves
Texas	25
Alaska	23
Gulf of Mexico Federal Offshore	18
California	9
New Mexico	6
Area Total	**81**

These areas logically correspond to the areas of the country with the largest volumes of crude oil reserves.

Figure 21. Coalbed Natural Gas Proved Reserves, 1989-2005



Source: Energy Information Administration, Office of Oil and Gas.

Production

U.S. production of AD wet natural gas decreased 11 percent from an estimated 2,742 billion cubic feet in 2004 to 2,432 billion cubic feet in 2005 (**Table 11**). Production of AD wet natural gas in the lower 48 States decreased from 2,467 billion cubic feet in 2004 to 2,174 billion cubic feet in 2005, a decline of 12 percent. The areas of the country with the largest AD wet natural gas production and their percentage of the total were:

Area	Percent of 2005 U.S. AD Gas Production
Gulf of Mexico Federal Offshore	26
Texas	25
Alaska	11
New Mexico	9
California	8
Area Total	**79**

Again, these areas logically correspond to the areas of the country with the largest volumes of crude oil production.

Table 12. Coalbed Natural Gas Proved Reserves and Production, 1989–2005
(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

Year	Alabama	Colorado	New Mexico	Utah	Wyoming	Eastern States[a]	Western States[b]	Others[c]	United States
					Reserves				
1989	537	1,117	2,022	NA	NA	NA	NA	0	3,676
1990	1,224	1,320	2,510	NA	NA	NA	NA	33	5,087
1991	1,714	2,076	4,206	NA	NA	NA	NA	167	8,163
1992	1,968	2,716	4,724	NA	NA	NA	NA	626	10,034
1993	1,237	3,107	4,775	NA	NA	NA	NA	1,065	10,184
1994	976	2,913	4,137	NA	NA	NA	NA	1,686	9,712
1995	972	3,461	4,299	NA	NA	NA	NA	1,767	10,499
1996	823	3,711	4,180	NA	NA	NA	NA	1,852	10,566
1997	1,077	3,890	4,351	NA	NA	NA	NA	2,144	11,462
1998	1,029	4,211	4,232	NA	NA	NA	NA	2,707	12,179
1999	1,060	4,826	4,080	NA	NA	NA	NA	3,263	13,229
2000	1,241	5,617	4,278	1,592	1,540	1,399	41	--	15,708
2001	1,162	6,252	4,324	1,685	2,297	1,453	358	--	17,531
2002	1,283	6,691	4,380	1,725	2,371	1,488	553	--	18,491
2003	1,665	6,473	4,396	1,224	2,759	1,528	698	--	18,743
2004	1,900	5,787	5,166	934	2,085	1,620	898	--	18,390
2005	1,773	6,772	5,249	902	2,446	1,822	928	--	19,892
					Production				
1989	23	12	56	NA	NA	NA	NA	0	91
1990	36	26	133	NA	NA	NA	NA	1	196
1991	68	48	229	NA	NA	NA	NA	3	348
1992	89	82	358	NA	NA	NA	NA	10	539
1993	103	125	486	NA	NA	NA	NA	18	752
1994	108	179	530	NA	NA	NA	NA	34	851
1995	109	226	574	NA	NA	NA	NA	47	956
1996	98	274	575	NA	NA	NA	NA	56	1,003
1997	111	312	597	NA	NA	NA	NA	70	1,090
1998	123	401	571	NA	NA	NA	NA	99	1,194
1999	108	432	582	NA	NA	NA	NA	130	1,252
2000	109	451	550	74	133	58	4	--	1,379
2001	111	490	517	83	278	69	14	--	1,562
2002	117	520	471	103	302	68	33	--	1,614
2003	98	488	451	97	344	71	51	--	1,600
2004	121	520	528	82	320	72	77	--	1,720
2005	113	515	514	75	336	90	89	--	1,732

[a]Includes Indiana, Ohio, Pennsylvania, Virginia, and West Virginia.
[b]Includes Arkansas, Kansas, Montana, and Oklahoma.
[c]Includes Oklahoma, Pennsylvania, Utah, Virginia, West Virginia, and Wyoming; these states are individually listed or grouped in Eastern States and Western States for 2000-2004.
NA = Not applicable.
Source: Energy Information Administration, Office of Oil and Gas.

Coalbed Natural Gas

Proved Reserves

Proved reserves of coalbed natural gas increased to 19,892 billion cubic feet in 2005, 8 percent higher than the 2004 level (18,390 billion cubic feet) (**Figure 21**). Coalbed natural gas accounted for 10 percent of all 2005 dry natural gas reserves (**Table 12**). Five States (Colorado, New Mexico, Wyoming, Alabama and Utah) currently have the vast majority (86 percent) of U.S. coalbed natural gas proved reserves. Two of them (Alabama and Utah) reported declines in their proved coalbed natural gas reserves in 2005.

Production

U.S. coalbed natural gas production increased less than 1 percent in 2005 to 1,732 billion cubic feet. It accounted for 9 percent of U.S. dry gas production.

Areas of Note: Large Discoveries and Reserves Additions

The following State or area discussions summarize notable activities during the year concerning expected new field reserves, development plans, and possible production rates as reported in various trade publications. The citations do not necessarily reflect EIA's concurrence, but are considered important enough to be brought to the reader's attention.

Texas

Texas had a 13 percent increase in dry natural gas proved reserves in 2005 (6,552 billion cubic feet), the largest of any State. Production also increased 2 percent. This resulted primarily from extensions in the Newark East Field in north central Texas and natural gas fields in the Permian Basin of west Texas.

- **Newark East Field**: On July 26, 2005 Devon Energy Corporation announced that it had reached a significant milestone in the life of the Barnett Shale natural gas field in north Texas. The company reported that cumulative gross production from Devon's operated wells reached one trillion cubic feet (Tcf) of natural gas in June. Devon operates 1,830 wells in the Barnett Shale. The company acquired its initial interest in the Barnett Shale by purchasing Mitchell Energy & Development Corp. in January 2002. Devon has drilled nearly 1,000 additional wells since the acquisition and has increased daily production by over 200 million cubic feet (Mmcf) per day. {42}

Colorado

Colorado's dry natural gas reserves increased by 13 percent (1,853 billion cubic feet) in 2005. This was the result of revision increases on the Colorado side of the largest natural gas area in the United States, the San Juan Basin Gas Area of Colorado and New Mexico.

Wyoming

Wyoming's dry natural gas reserves increased by 5 percent (1,142 billion cubic feet) in 2005. This was the result of development in deep, tight natural gas plays.

- **Pinedale Field**: On August 10, 2005, Ultra Petroleum Corporation (Ultra) confirmed that the Wyoming Oil & Gas Conservation Commission voted to approve 10-acre density drilling of Lance Pool (Lance and Mesaverde Formation) wells on Ultra's Pinedale Anticline acreage in the Stewart Point and Mesa areas of the Pinedale Anticline. {43}
- **Jonah Field**: EnCana Corporation increased its estimate of the gas in place in the Jonah Field using specialized core analysis, with original gas in place now estimated at 350 billion to 400 billion cubic feet per square mile. In 2005, EnCana also initiated 24-hour-a-day fracturing operations. {44}

Areas of Note: Large Reserves Declines

The following areas had large declines in dry natural gas proved reserves due to downward revisions or unreplaced production.

Gulf of Mexico Federal Offshore

Proved dry natural gas reserves in the Gulf of Mexico Federal Offshore decreased by 10 percent (-1,805 billion cubic feet) in 2005. Production also decreased by 25 percent from 3,874 billion cubic feet in 2004 to 2,906 billion cubic feet in 2005.

The large proved natural gas reserves drop experienced in the Gulf of Mexico was primarily due to storm damage in August and September of 2005 from Hurricanes Katrina and Rita. These storms destroyed 113 offshore platforms and seriously damaged offshore pipelines and coastal oil and natural gas processing facilities, impacting the Nation's oil and gas production.

For more complete assessment of the 2005 hurricane damage effects, readers should consult the joint report prepared by the Energy Information Administration, Office of Oil and Gas and the U.S. Department of Energy, Office of Fossil Energy entitled *"Impact of the 2005 Hurricanes on the Natural Gas Industry in the Gulf of Mexico Region."* which was published in July 2006.

Kansas

Kansas' proved dry natural gas reserves decreased by 7 percent (-338 billion cubic feet) in 2005. Production in Kansas increased 1 percent (+4 billion cubic feet) in 2005.

New Mexico

New Mexico's proved dry natural gas reserves decreased by 2 percent (-311 billion cubic feet) in 2005. Production in New Mexico decreased 2 percent (-34 billion cubic feet) in 2005.

Reserves in Nonproducing Status

Nonproducing proved natural gas reserves (wet after lease separation) of 59,658 billion cubic feet were reported in 2005, 16 percent more than the 51,412 billion cubic feet reported in 2004 (**Appendix D, Table D10**). About 31 percent of the reserves in nonproducing status are located in Texas. Another 15 percent are in the Gulf of Mexico Federal Offshore, as most new deepwater reserves are in the nonproducing category. Wells or reservoirs are nonproducing due to any of several operational reasons. These include awaiting well workovers, the drilling of extensions or additional development wells, installation of production or pipeline facilities, and depletion of other zones or reservoirs before recompletion in reservoirs not currently open to production (called "behind pipe" reserves).

5. Natural Gas Liquids Statistics

Natural Gas Liquids

Proved Reserves

U.S. natural gas liquids proved reserves increased 3 percent to 8,165 million barrels in 2005 (**Table 13**). Reserve additions replaced 130 percent of 2005 natural gas liquids production.

The reserves of seven areas account for 87 percent of the Nation's natural gas liquids proved reserves.

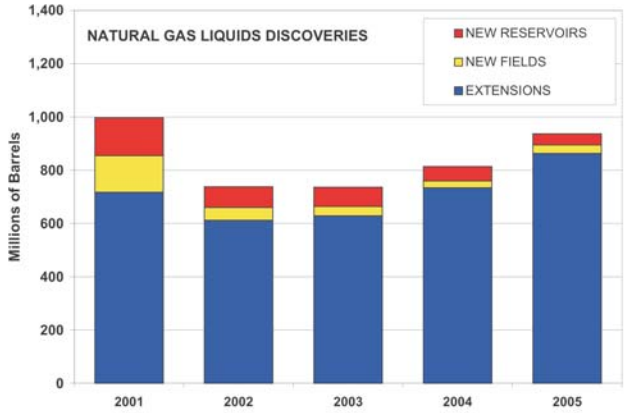
Area	Percent of U.S. NGL Reserves
Texas	38
Utah and Wyoming	11
Oklahoma	10
New Mexico	10
Gulf of Mexico Federal Offshore	8
Colorado	6
Alaska	4
Area Total	**87**

The volumes of natural gas liquids proved reserves and production shown in **Table 13** are the sum of the natural gas plant liquid volumes listed in **Table 14** and the lease condensate volumes listed in **Table 15.**

Total Discoveries

Total discoveries of natural gas liquids reserves were 937 million barrels in 2005, an increase of 15 percent from 2004 (814 million barrels). Areas with the largest total discoveries were:

Area	Percent of U.S. NGL Total Discoveries
Texas	54
Oklahoma	10
Utah and Wyoming	8
Gulf of Mexico Federal Offshore	8
New Mexico	6
Louisiana	6
Colorado	6



Extensions

Extensions were 863 million barrels in 2005, 18 percent more than the 2004 volume of 734 million barrels. Areas with the largest extensions were Texas (57 percent of the National total), Oklahoma (10 percent), Utah and Wyoming (9 percent), and New Mexico (6 percent).

New Field Discoveries

New field discoveries in 2005 (32 million barrels) were 23 percent higher than in 2004 (26 million barrels). Areas with the largest new field discoveries were the Gulf of Mexico Federal Offshore (66 percent) and Texas (25 percent).

New Reservoir Discoveries in Old Fields

New reservoir discoveries in old fields in 2005 (42 million barrels) were 22 percent lower than they were in 2004 (54 million barrels). Areas with the largest new reservoir discoveries in old fields were the Gulf of Mexico Federal Offshore (50 percent of the National total), Louisiana (29 percent), and Texas (17 percent).

Revisions and Adjustments

In 2005, there were 968 million barrels of revision increases, 947 million barrels of revision decreases, and -89 million barrels of adjustments. The net of revisions and adjustments was -68 million barrels.

Table 13. Natural Gas Liquids Proved Reserves, Reserves Changes, and Production, 2005[a]
(Million Barrels of 42 U.S. Gallons)

State and Subdivision	Published Proved Reserves 12/31/04	Changes in Reserves During 2005: Adjustments (+,–)	Revision Increases (+)	Revision Decreases (–)	Sales (–)	Acquisitions (+)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (–)	Proved Reserves 12/31/05
Alaska	369	0	0	0	0	0	0	0	0	17	352
Lower 48 States	**7,559**	**-89**	**968**	**947**	**440**	**596**	**863**	**32**	**42**	**771**	**7,813**
Alabama	50	0	2	1	14	28	1	0	0	5	61
Arkansas	3	0	0	0	0	0	0	0	0	0	3
California	122	-6	31	6	8	10	5	0	0	11	137
Coastal Region Onshore	19	-3	2	1	0	0	0	0	0	1	16
Los Angeles Basin Onshore	8	0	1	1	0	1	0	0	0	0	9
San Joaquin Basin Onshore	95	-3	28	4	8	9	5	0	0	10	112
State Offshore	0	0	0	0	0	0	0	0	0	0	0
Colorado	465	-19	55	54	33	49	51	1	0	31	484
Florida	12	-5	0	0	0	0	0	0	0	0	7
Kansas	271	-25	12	20	2	3	5	0	0	20	224
Kentucky	72	-9	8	2	0	0	3	1	0	3	70
Louisiana	263	20	42	37	11	15	40	0	12	52	292
North	74	-3	7	4	1	2	15	0	0	7	83
South Onshore	153	19	30	28	7	10	22	0	7	38	168
State Offshore	36	4	5	5	3	3	3	0	5	7	41
Michigan	48	-7	3	3	1	1	1	0	0	3	39
Mississippi	6	1	1	1	0	1	0	0	0	1	7
Montana	6	3	1	1	0	0	1	0	0	1	9
New Mexico	864	-12	96	106	58	78	55	0	0	77	840
East	274	-14	33	32	39	54	33	0	0	38	271
West	590	2	63	74	19	24	22	0	0	39	569
North Dakota	43	2	5	3	0	2	5	0	0	5	49
Oklahoma	790	16	159	149	25	35	89	0	2	78	839
Texas	2,801	27	344	371	249	316	491	8	7	294	3,080
RRC District 1	36	2	2	3	2	2	3	0	0	4	36
RRC District 2 Onshore	79	6	9	12	9	14	16	1	1	14	91
RRC District 3 Onshore	221	3	36	38	8	9	36	4	3	40	226
RRC District 4 Onshore	326	-16	44	47	30	34	41	1	2	46	309
RRC District 5	53	-15	6	4	1	1	11	0	1	4	48
RRC District 6	304	-4	23	33	17	35	53	0	0	28	333
RRC District 7B	43	-10	16	6	3	13	44	0	0	7	90
RRC District 7C	383	-4	35	43	23	24	68	1	0	30	411
RRC District 8	499	12	47	68	41	64	106	1	0	45	575
RRC District 8A	197	24	36	14	21	42	5	0	0	19	250
RRC District 9	235	38	29	46	19	25	47	0	0	24	285
RRC District 10	420	-9	61	55	75	53	61	0	0	33	423
State Offshore	5	0	0	2	0	0	0	0	0	0	3
Utah and Wyoming	927	-85	81	72	4	15	79	0	0	62	879
West Virginia	85	-16	12	1	0	2	7	0	0	4	85
Federal Offshore[b]	721	26	114	119	35	41	29	21	21	123	696
Pacific (California)	8	0	0	0	0	0	0	0	0	0	8
Gulf of Mexico (Louisiana)[b]	615	29	89	102	34	37	27	21	19	98	603
Gulf of Mexico (Texas)	98	-3	25	17	1	4	2	0	2	25	85
Miscellaneous[c]	10	0	2	1	0	0	1	1	0	1	12
U.S. Total	**7,928**	**-89**	**968**	**947**	**440**	**596**	**863**	**32**	**42**	**788**	**8,165**

[a]This table is natural gas plant liquids (Table 14) plus lease condensate (Table 15).
[b]Includes Federal offshore Alabama.
[c]Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, New York, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, and Virginia.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," and Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production." They may differ from the official Energy Information Administration production data for natural gas and natural gas liquids for 2005 contained in the publications *Petroleum Supply Annual 2005*, DOE/EIA-0340(05) and *Natural Gas Annual 2005* DOE/EIA-0131(05).

Source: Energy Information Administration, Office of Oil and Gas.

Table 14. Natural Gas Plant Liquids Proved Reserves and Production, 2005
(Million Barrels of 42 U.S. Gallons)

State and Subdivision	2005 Reserves	2005 Production
Alaska	352	17
Lower 48 States	**6,551**	**597**
Alabama	31	2
Arkansas	2	0
California	135	11
Coastal Region Onshore	16	1
Los Angeles Basin Onshore	9	0
San Joaquin Basin Onshore	110	10
State Offshore	0	0
Colorado	386	26
Florida	7	0
Kansas	218	19
Kentucky	69	3
Louisiana	191	29
North	57	4
South Onshore	103	20
State Offshore	31	5
Michigan	36	3
Mississippi	2	0
Montana	9	1
New Mexico	781	70
East	237	33
West	544	37
North Dakota	45	5
Oklahoma	697	65
Texas	2,723	247
RRC District 1	31	3
RRC District 2 Onshore	72	11
RRC District 3 Onshore	148	26
RRC District 4 Onshore	238	33
RRC District 5	40	3
RRC District 6	264	22
RRC District 7B	89	7
RRC District 7C	391	27
RRC District 8	559	43
RRC District 8A	248	19
RRC District 9	276	23
RRC District 10	367	30
State Offshore	0	0
Utah and Wyoming	710	50
West Virginia	84	4
Federal Offshore[a]	416	61
Pacific (California)	0	0
Gulf of Mexico (Louisiana)[a]	407	59
Gulf of Mexico (Texas)	9	2
Miscellaneous[b]	9	1
U.S. Total	**6,903**	**614**

[a]Includes Federal Offshore Alabama.

[b]Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, New York, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, and Virginia.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," and Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production." They may differ from the official Energy Information Administration production data for natural gas plant liquids for 2005 contained in the publications *Petroleum Supply Annual 2005, DOE/EIA-0340(2005) and Natural Gas Annual 2005*, DOE/EIA-0131(2005).

Source: Energy Information Administration, Office of Oil and Gas.

Table 15. Lease Condensate Proved Reserves and Production, 2005
(Million Barrels of 42 U.S. Gallons)

State and Subdivision	2005 Reserves	2005 Production
Alaska	0	0
Lower 48 States	**1,262**	**174**
Alabama	30	3
Arkansas	1	0
California	2	0
Coastal Region Onshore	0	0
Los Angeles Basin Onshore	0	0
San Joaquin Basin Onshore	2	0
State Offshore	0	0
Colorado	98	5
Florida	0	0
Kansas	6	1
Kentucky	1	0
Louisiana	101	23
North	26	3
South Onshore	65	18
State Offshore	10	2
Michigan	3	0
Mississippi	5	1
Montana	0	0
New Mexico	59	7
East	34	5
West	25	2
North Dakota	4	0
Oklahoma	142	13
Texas	357	47
RRC District 1	5	1
RRC District 2 Onshore	19	3
RRC District 3 Onshore	78	14
RRC District 4 Onshore	71	13
RRC District 5	8	1
RRC District 6	69	6
RRC District 7B	1	0
RRC District 7C	20	3
RRC District 8	16	2
RRC District 8A	2	0
RRC District 9	9	1
RRC District 10	56	3
State Offshore	3	0
Utah and Wyoming	169	12
West Virginia	1	0
Federal Offshore[a]	280	62
Pacific (California)	8	0
Gulf of Mexico (Louisiana)[a]	196	39
Gulf of Mexico (Texas)	76	23
Miscellaneous[b]	3	0
U.S. Total	**1,262**	**174**

[a]Includes Federal Offshore Alabama.
[b]Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, New York, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, and Virginia.

Note: The estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves" 2005.
Source: Energy Information Administration, Office of Oil and Gas.

Sales and Acquisitions

There were 596 million barrels of acquisitions and 440 million barrels of sales in 2005. The net of these transactions added 156 million barrels of natural gas liquids proved reserves.

Production

Natural gas liquids production was an estimated 788 million barrels in 2005, a decrease of 5 percent from 2004's production (827 million barrels).

Six areas accounted for about 88 percent of the Nation's natural gas liquids production.

Area	Percent of U.S. NGL Production
Texas	37
Gulf of Mexico Federal Offshore	16
Oklahoma	10
New Mexico	10
Utah and Wyoming	8
Louisiana	7
Area Total	**88**

Natural Gas Plant Liquids

Proved Reserves

Natural gas plant liquids proved reserves increased in 2005 to 6,903 million barrels, a 3 percent increase from the 2004 level (6,707 million barrels) (**Table 14**). Six areas accounted for about 82 percent of the Nation's natural gas plant liquids proved reserves:

Area	Percent of U.S. Gas Plant Liquids
Texas	39
New Mexico	11
Utah and Wyoming	10
Oklahoma	10
Gulf of Mexico Federal Offshore	6
Colorado	6
Area Total	**82**

Production

Natural gas plant liquids production decreased 5 percent in 2005—from 645 million barrels in 2004 to 614 million barrels of production (**Table 14**).

The number of active gas plants increased in 2005. According to survey results from Form EIA-64A, the number of unique active U.S. natural gas processing plants increased from 493 in 2004 to 508 in 2005.

The top six areas for proved reserves of natural gas plant liquids accounted for about 84 percent of the Nation's natural gas plant liquids production:

Area	Percent of U.S. Gas Plant Liquids Production
Texas	40
New Mexico	11
Oklahoma	11
Gulf of Mexico Federal Offshore	10
Utah and Wyoming	8
Colorado	4
Area Total	**84**

Natural gas processing plants are usually located in the same general area where the natural gas is produced. Table E4 in Appendix E lists the volumes of natural gas produced and processed in the same State, and the volumes of liquids extracted.

Lease Condensate

Proved Reserves

Proved reserves of lease condensate in the United States were 1,262 million barrels in 2005 (**Table 15**). This was 3 percent higher than the volume reported in 2004 (1,221 million barrels). The reserves of five areas accounts for about 82 percent of the Nation's lease condensate proved reserves.

Area	Percent of U.S. Condensate Reserves
Texas	28
Gulf of Mexico Federal Offshore	22
Utah and Wyoming	13
Oklahoma	11
Louisiana	8
Area Total	**82**

Production

Production of lease condensate was 174 million barrels in 2005, a decrease of 4 percent from 2004's production (182 million barrels). The production of five areas account for about 90 percent of the Nation's lease condensate production.

Area	Percent of U.S. Condensate Production
Gulf of Mexico Federal Offshore	36
Texas	27
Louisiana	13
Oklahoma	7
Utah and Wyoming	7
Area Total	**90**

Reserves in Nonproducing Status

Like crude oil and natural gas, not all lease condensate proved reserves were producing during 2005. Proved reserves of 430 million barrels of lease condensate, an increase of 5 percent from 2004's level (409 million barrels), were reported in nonproducing status in 2005 (**Appendix D, Table D10**). About 29 percent of the nonproducing lease condensate reserves were located in the Gulf of Mexico Federal Offshore.

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Appendix A

Operator Level Data

Appendix A

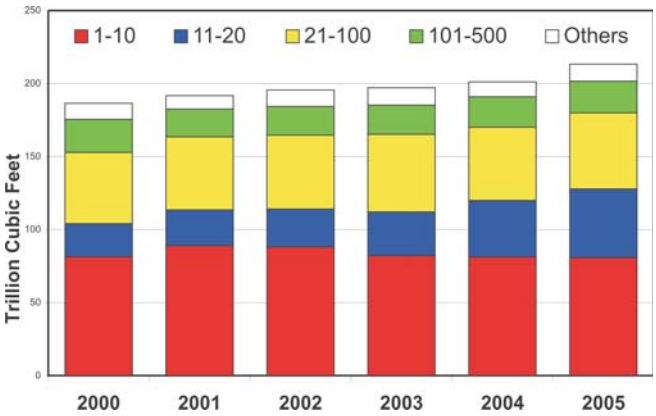
Operator Level Data

This appendix provides a series of tables of the proved reserves and production by production size class for the years 2000 through 2005 for crude oil and natural gas well operators. The tables show the volumetric change and percent change from the previous year and from 2000. In addition they show the 2005 average per operator in each class. All companies that reported to EIA were ranked by production size for each of the 6 years. We computed company production size classes as the sum of the barrel oil equivalent of the crude oil production, lease condensate production, and wet gas production for each operator. The companies were then placed in the following production size classes: 1-10, 11-20, 21-100, 101-500, and all "other" oil and gas operators. The "other" category contains 14,658 small operators. We estimated production and reserves for small operators for 2005 from a sample of approximately 3 percent.

Class 1-10 contains the 10 highest producing companies each year on a barrel oil equivalent basis. These companies are not necessarily the same 10 companies each year.

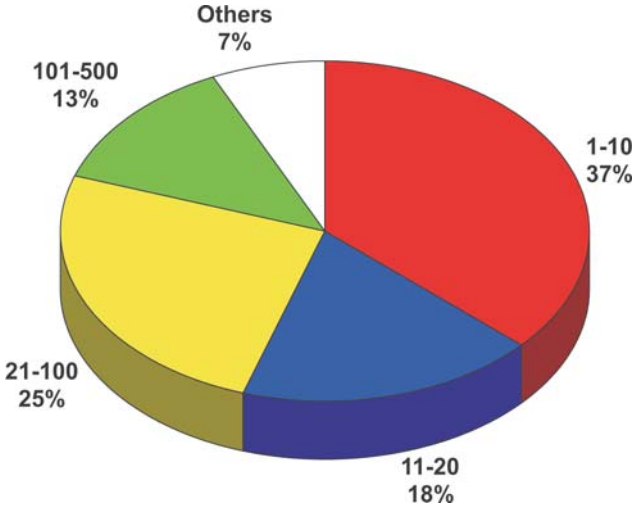
Natural Gas Proved Reserves

The wet natural gas proved reserves reported for 2000 through 2005 have changed from 186,510 billion cubic feet to 213,308 billion cubic feet (**Table A1**). These proved reserves are concentrated in the larger companies. In 2005, the top 20 operators (Class 1-10 and Class 11-20) producing companies had 60 percent of the proved reserves of natural gas. The next two size classes contain 80 and 400 companies and account for 24 and 10 percent of the U.S. natural gas proved reserves, respectively. The top 20 operators had an increase of 23 percent in their natural gas proved reserves from 2000 to 2005. The rest of the operators in (Class 21-100, Class 101-500, and Class Other) had an increase of 3 percent in their reserves in the same time period. In 2005, the top 20 operators' natural gas reserves had an increase of 7 percent from 2004.



Natural Gas Production

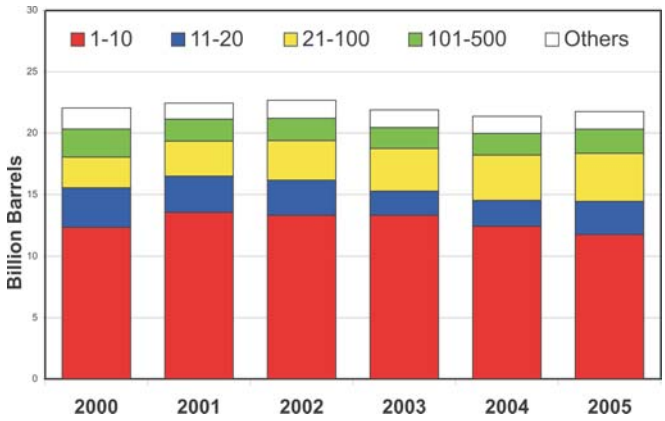
Wet natural gas production has decreased from 20,017 billion cubic feet in 2004 to 19,259 billion cubic feet in 2005 (**Table A2**). In 2005, the top 20 producing companies had 55 percent of the production of wet natural gas. The next two size classes have 25 and 13 percent of the wet natural gas production, respectively. The top 20 operators had a decrease of 7 percent in wet natural gas production from 2000 to 2005. The rest of the operators had a decrease of 1 percent from 2000 to 2005. The top 20 operators' wet natural gas production had a decrease of 6 percent in 2005 from 2004.



Crude Oil Proved Reserves

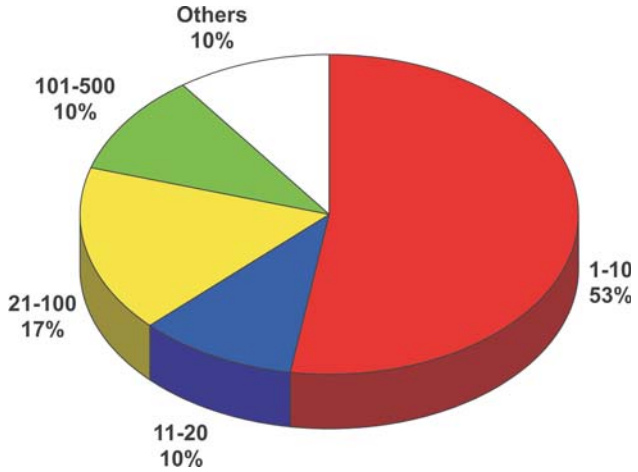
The 10 largest producing companies in 2005 had 54 percent of U.S. proved reserves of crude oil. While the 10 largest producing companies in 2005 had 54 percent of U.S. proved reserves of natural gas. The 20 largest oil and gas producing companies in 2005 had 66 percent of U.S. proved reserves of crude oil (**Table A3**), in contrast to wet natural gas where these same companies operated 60 percent of the total proved reserves.

U.S. proved reserves of crude oil increased 2 percent in 2005 from 2004. The top 20 producing companies proved reserves of crude oil during 2005 remained the same from 2004. The top 20 class had a decrease of 6 percent in their crude oil proved reserves from 2000 to 2005.



Crude Oil Production

Crude oil production reported for 2000 to 2005 has decreased from 1,819 million barrels to 1,733 million barrels (**Table A4**). The 20 largest oil and gas producing companies had 63 percent of U.S. production of crude oil in 2005. In 2000 they accounted for 67 percent of production.



This is in contrast to wet natural gas where these same companies produced 55 percent of the total. U.S. production of crude oil declined by 8 percent from 2000 to 2005. The top 20 operators had a decline of 14 percent in their oil production during the same period. U.S. production of crude oil declined 5 percent from 2004 to 2005. In the same period the top 20 operators production decreased by 7 percent.

Crude Oil and Natural Gas Fields

The number of fields in which Category I and Category II operators were active increased during the 2000-2005 period (**Table A5**). From 2000-2005, the number of fields in which the top 20 operators were active increased by 859 fields (16 percent) while in 2005 the number decreased by 535 fields from 2004.

We also include statistics for operator Category sizes at the bottom portion of tables in this appendix. These are the categories used by EIA in processing and assessing reserves surveys and are presented here as additional perspective. For further explanation of categories sizes see definitions and descriptions in Appendix E.

Ranked Crude Oil and Natural Gas Production

Table A6 lists the top U.S. Oil and gas operators ranked by reported 2005 operated production data.

Operators Formerly in the Ranks of the Top 50 Reported for the U.S. 1999-2005

Number	Formerly Operated As	Currently Operated By
1	AEC Oil & Gas (USA) Inc	Encana Oil & Gas Inc
2	Agip Petroleum Co Inc	Eni SpA
3	Altura Energy Ltd	Occidental Petroleum Corp
4	Arco Exploration & Production	BP Plc
5	Arguello Inc	Plains Explor & Prod Co
6	Barrett Resources Corp	Williams Energy Inc
7	BP Amoco	BP Plc
8	British Borneo USA Inc	Eni SpA
9	C N G Producing Co	Dominion Resources Inc
10	Chevron USA Production Co	ChevronTexaco Inc
11	Coastal Oil & Gas Corp	El Paso Energy
12	Coho Resources Inc	Denbury Resources Inc
13	Conoco Inc	ConocoPhillips Co
14	Evergreen Operating Corp	Pioneer Natural Resources USA
15	Fina Oil & Chemical Co	Total SA
16	Gruy Petroleum Management Co	Cimarex Energy Co
17	Helmerich & Payne Inc	Cimarex Energy Co
18	Howell Petroleum Corp	Anadarko Petroleum Corp
19	HS Resources Inc	Kerr-McGee Corp
20	Louis Dreyfus Natural Gas Corp	Dominion Resources Inc
21	Mitchell Energy & Development Corp	Devon Energy Corp
22	Nuevo Energy Co	Plains Explor & Prod Co
23	Ocean Energy Inc	Devon Energy Corp
24	Patina Oil & Gas Corp	Noble Energy Inc
25	Phillips Petroleum Co	ConocoPhillips Co
26	Prize Operating Co	Cimarex Energy Co
27	River Gas Corp	ConocoPhillips Co
28	Santa Fe Snyder Corp	Devon Energy Corp
29	Stocker Resources Inc	Plains Explor & Prod Co
30	Texaco Inc	ChevronTexaco Inc
31	Tom Brown Inc	Encana Oil & Gas Inc
32	Union Pacific Resources	Anadarko Petroleum Corp
33	Unocal Corp	Chevron Texaco Inc
34	Vastar Resources Inc	BP Plc
35	Westport Resources Corp	Kerr-McGee Corp

Table A1. Natural Gas Proved Reserves, Wet After Lease Separation, by Operator Production Size Class, 2000–2005
(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

Size Class	2000	2001	2002	2003	2004	2005	2004–2005 Volume and Percent Change	2000–2005 Volume and Percent Change	2005 Average Reserves per Operator
Class 1-10	81,437	88,936	88,100	82,222	81,325	80,785	-540	-652	8,078.512
Percent of Total	43.7%	46.4%	45.0%	41.7%	40.4%	37.9%	-0.7%	-0.8%	
Class 11-20	22,590	24,588	25,938	29,890	38,643	47,078	8,435	24,488	4,707.841
Percent of Total	12.1%	12.8%	13.3%	15.2%	19.2%	22.1%	21.8%	108.4%	
Class 21-100	48,832	50,055	50,633	53,098	50,149	52,061	1,912	3,229	650.767
Percent of Total	26.2%	26.1%	25.9%	26.9%	24.9%	24.4%	3.8%	6.6%	
Class 101-500	22,620	19,046	19,723	20,030	20,912	21,737	825	-884	54.341
Percent of Total	12.1%	9.9%	10.1%	10.2%	10.4%	10.2%	3.9%	-3.9%	
Class Other (14,658)	11,030	9,118	11,167	11,905	10,170	11,647	1,477	617	0.795
Percent of Total	5.9%	4.8%	5.7%	6.0%	5.1%	5.5%	14.5%	5.6%	
Category I (172)	162,144	169,056	173,325	173,225	178,269	189,644	11,375	27,500	1,102.582
Percent of Total	86.9%	88.2%	88.6%	87.9%	88.6%	88.9%	6.4%	17.0%	
Category II (522)	13,123	13,346	11,051	11,983	12,494	11,838	-656	-1,286	22.678
Percent of Total	7.0%	7.0%	5.7%	6.1%	6.2%	5.5%	-5.3%	-9.8%	
Category III (14,464)	11,243	9,342	11,184	11,937	10,437	11,826	1,389	583	0.818
Percent of Total	6.0%	4.9%	5.7%	6.1%	5.2%	5.5%	13.3%	5.2%	
Total Published	**186,510**	**191,743**	**195,561**	**197,145**	**201,200**	**213,308**	**12,108**	**26,798**	**14.072**
Percent of Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**6.0%**	**14.4%**	

R = Revised

Note: There were 14,464 active Category III operators in the 2005 sample frame. The reserves and production of Category III operators were estimated from an adjusted sample of 661 Category III operators (Table E2). The "other" size class represents 14,658 operators in the 2005 frame (15,158 active operators minus the 500 largest operators).

Source: Energy Information Administration, Office of Oil and Gas.

Table A2. Natural Gas Production, Wet After Lease Separation, by Operator Production Size Class, 2000–2005
(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

Size Class	2000	2001	2002	2003	2004	2005	2004–2005 Volume and Percent Change	2000–2005 Volume and Percent Change	2005 Average Production per Operator
Class 1-10	8,495	9,019	8,996	8,220	7,617	7,068	-548	-1,426	706.833
Percent of Total	42.1%	43.7%	44.4%	40.6%	38.1%	36.7%	-7.2%	-16.8%	
Class 11-20	2,886	3,064	2,854	3,136	3,647	3,534	-112	648	353.437
Percent of Total	14.3%	14.8%	14.1%	15.5%	18.2%	18.4%	-3.1%	22.5%	
Class 21-100	4,965	4,949	4,763	5,275	4,982	4,832	-150	-133	60.402
Percent of Total	24.6%	24.0%	23.5%	26.1%	24.9%	25.1%	-3.0%	-2.7%	
Class 101-500	2,780	2,609	2,475	2,386	2,559	2,506	-52	-274	6.266
Percent of Total	13.8%	12.6%	12.2%	11.8%	12.8%	13.0%	-2.0%	-9.9%	
Class Other (14,658)	1,038	1,000	1,161	1,215	1,213	1,318	105	280	0.090
Percent of Total	5.1%	4.8%	5.7%	6.0%	6.1%	6.8%	8.6%	26.9%	
Category I (172)	17,096	17,672	17,335	17,347	17,036	16,311	-724	-784	94.834
Percent of Total	84.8%	85.6%	85.6%	85.7%	85.1%	84.7%	-4.3%	-4.6%	
Category II (522)	1,921	1,932	1,738	1,648	1,718	1,605	-113	-316	3.075
Percent of Total	9.5%	9.4%	8.6%	8.1%	8.6%	8.3%	-6.6%	-16.5%	
Category III (14,464)	1,147	1,038	1,176	1,236	1,263	1,342	80	195	0.093
Percent of Total	5.7%	5.0%	5.8%	6.1%	6.3%	7.0%	6.3%	17.0%	
Total Published	**20,164**	**20,642**	**20,248**	**20,231**	**20,017**	**19,259**	**-758**	**-905**	**1.271**
Percent of Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**-3.8%**	**-4.5%**	

R = Revised

Note: There were 14,464 active Category III operators in the 2005 sample frame. The reserves and production of Category III operators were estimated from an adjusted sample of 661 Category III operators (Table E2). The "other" size class represents 14,658 operators in the 2005 frame (15,158 active operators minus the 500 largest operators).

Source: Energy Information Administration, Office of Oil and Gas.

Table A3. Crude Oil Proved Reserves by Operator Production Size Class, 2000–2005
(Million Barrels of 42 U.S. Gallons)

Size Class	2000	2001	2002	2003	2004	2005	2004–2005 Volume and Percent Change	2000–2005 Volume and Percent Change	2005 Average Reserves per Operator
Class 1-10	12,367	13,590	13,346	13,355	12,454	11,775	-679	-592	1,177.522
Percent of Total	56.1%	60.5%	58.9%	61.0%	58.3%	54.1%	-5.4%	-4.8%	
Class 11-20	3,172	2,901	2,817	1,907	2,053	2,659	607	-512	265.939
Percent of Total	14.4%	12.9%	12.4%	8.7%	9.6%	12.2%	29.6%	-16.2%	
Class 21-100	2,505	2,856	3,230	3,483	3,711	3,915	204	1,410	48.934
Percent of Total	11.4%	12.7%	14.2%	15.9%	17.4%	18.0%	5.5%	56.3%	
Class 101-500	2,286	1,794	1,817	1,705	1,761	1,969	208	-317	4.923
Percent of Total	10.4%	8.0%	8.0%	7.8%	8.2%	9.1%	11.8%	-13.9%	
Class Other (14,658)	1,716	1,305	1,468	1,440	1,393	1,439	46	-277	0.098
Percent of Total	7.8%	5.8%	6.5%	6.6%	6.5%	6.6%	3.3%	-16.2%	
Category I (172)	19,421	20,325	20,213	19,499	19,055	19,348	292	-74	112.486
Percent of Total	88.1%	90.6%	89.1%	89.1%	89.2%	88.9%	1.5%	-0.4%	
Category II (522)	873	794	992	937	906	954	48	81	1.827
Percent of Total	4.0%	3.5%	4.4%	4.3%	4.2%	4.4%	5.3%	9.3%	
Category III (14,464)	1,751	1,326	1,472	1,456	1,410	1,456	46	-295	0.101
Percent of Total	7.9%	5.9%	6.5%	6.6%	6.6%	6.7%	3.3%	-16.9%	
Total Published	**22,045**	**22,446**	**22,677**	**21,891**	**21,371**	**21,757**	**386**	**-288**	**1.435**
Percent of Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**1.8%**	**-1.3%**	

R = Revised

Note: There were 14,464 active Category III operators in the 2005 sample frame. The reserves and production of Category III operators were estimated from an adjusted sample of 661 Category III operators (Table E2). The "other" size class represents 14,658 operators in the 2005 frame (15,158 active operators minus the 500 largest operators).

Source: Energy Information Administration, Office of Oil and Gas.

Table A4. Crude Oil Production by Operator Production Size Class, 2000–2005
(Million Barrels of 42 U.S. Gallons)

Size Class	2000	2001	2002	2003	2004	2005	2004–2005 Volume and Percent Change	2000–2005 Volume and Percent Change	2005 Average Production per Operator
Class 1-10	961	1,061	1,037	1,047	986	912	-75	-49	91.179
Percent of Total	51.1%	55.4%	55.3%	55.8%	54.2%	52.6%	-7.6%	-5.1%	
Class 11-20	304	240	233	205	180	178	-3	-127	17.766
Percent of Total	16.2%	12.5%	12.4%	10.9%	9.9%	10.3%	-1.4%	-41.7%	
Class 21-100	214	233	240	272	303	293	-10	79	3.661
Percent of Total	11.4%	12.2%	12.8%	14.5%	16.6%	16.9%	-3.2%	37.0%	
Class 101-500	211	195	181	178	172	178	6	-33	0.445
Percent of Total	11.2%	10.2%	9.7%	9.5%	9.5%	10.3%	3.4%	-15.6%	
Class Other (14,658)	190	186	184	175	178	173	-5	-17	0.012
Percent of Total	10.1%	9.7%	9.8%	9.3%	9.8%	10.0%	-2.8%	-9.0%	
Category I (172)	1,572	1,612	1,573	1,574	1,534	1,451	-83	-121	8.438
Percent of Total	83.6%	84.2%	83.9%	83.9%	84.3%	83.7%	-5.4%	-7.7%	
Category II (522)	111	112	115	124	105	105	0	-6	0.202
Percent of Total	5.9%	5.8%	6.1%	6.6%	5.8%	6.1%	-0.2%	-5.0%	
Category III (14,464)	197	191	187	179	180	176	-3	-21	0.012
Percent of Total	10.5%	10.0%	10.0%	9.5%	9.9%	10.2%	-1.8%	-10.6%	
Total Published	**1,880**	**1,915**	**1,875**	**1,877**	**1,819**	**1,733**	**-86**	**-147**	**0.114**
Percent of Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**-4.7%**	**-7.8%**	

R = Revised

Note: There were 14,464 active Category III operators in the 2005 sample frame. The reserves and production of Category III operators were estimated from an adjusted sample of 661 Category III operators (Table E2). The "other" size class represents 14,658 operators in the 2005 frame (15,158 active operators minus the 500 largest operators).

Source: Energy Information Administration, Office of Oil and Gas.

Table A5. Operator Field Count by Operator Production Size Class, 2000–2005

Size Class	2000	2001	2002	2003	2004	2005	2004–2005 Number and Percent Change	2000–2005 Number and Percent Change	2005 Average Number of Fields per Operator
Class 1-10	3,444	3,794	3,596	3,689	3,409	3,738	329	294	373.800
Percent of Total	13.0%	14.0%	12.9%	13.2%	12.4%	13.2%	9.7%	8.5%	
Class 11-20	1,923	2,212	2,392	2,492	3,352	2,488	-864	565	248.800
Percent of Total	7.2%	8.2%	8.6%	8.9%	12.2%	8.8%	-25.8%	29.4%	
Class 21-100	7,084	7,195	7,947	8,168	8,071	9,196	1,125	2,112	114.950
Percent of Total	26.7%	26.5%	28.4%	29.3%	29.4%	32.6%	13.9%	29.8%	
Class 101-500	12,580	12,435	12,661	11,859	10,698	10,845	147	-1,735	27.113
Percent of Total	47.4%	45.9%	45.3%	42.5%	39.0%	38.4%	1.4%	-13.8%	
Rest	1,529	1,480	1,349	1,709	1,929	1,952	23	423	10.062
Percent of Total	5.8%	5.5%	4.8%	6.1%	7.0%	6.9%	1.2%	27.7%	
Category I	16,174	16,196	17,049	16,760	17,368	17,858	490	1,684	103.826
Percent of Total	60.9%	59.7%	61.0%	60.0%	63.3%	63.3%	2.8%	10.4%	
Category II	10,146	10,764	10,473	10,688	9,486	9,738	252	-408	18.655
Percent of Total	38.2%	39.7%	37.5%	38.3%	34.5%	34.5%	2.7%	-4.0%	
Total	**26,560**	**27,116**	**27,945**	**27,917**	**27,459**	**28,219**	**760**	**1,659**	**40.661**
Percent of Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**2.8%**	**6.2%**	

Note: Includes only data from Category I and Category II operators. In 2005 there were 172 Category I operators and 522 Category II operators. The “rest” size class had 194 operators in 2005.

Source: Energy Information Administration, Office of Oil and Gas.

Table A6. Top 50 U.S. Operators Ranked by Reported 2005 Operated Production Data

Rank	Company Name	Crude Oil Production (thousand barrels/day)	Rank	Company Name	Total Natural Gas Production (milion cubic feet/day)
1	BP PLC	825	1	BP PLC	3,465
2	CHEVRON CORP	478	2	CHEVRON CORP	2,355
3	CONOCOPHILLIPS	346	3	CONOCOPHILLIPS	2,110
4	SHELL OIL CO	324	4	EXXONMOBIL CORP	2,057
5	OCCIDENTAL OIL & GAS CORP	283	5	DEVON ENERGY CORP	2,002
6	AERA ENERGY LLC	199	6	BURLINGTON RESOURCES INC	1,942
7	EXXONMOBIL CORP	145	7	CHESAPEAKE ENERGY CORP	1,657
8	KERR-MCGEE CORP	133	8	SHELL OIL CO	1,608
9	APACHE CORP	91	9	ANADARKO PETROLEUM CORP	1,471
10	AMERADA HESS CORP	72	10	ENCANA CORP	1,419
	Top 10 Volume Subtotal	***2,896***		***Top 10 Volume Subtotal***	***20,086***
	Top 10 Percentage of U.S. Total	***55%***		***Top 10 Percentage of U.S. Total***	***38%***
11	PLAINS EXPLORATION & PRODUCTION CO	59	11	KERR-MCGEE CORP	1,371
12	KINDER MORGAN, INC	57	12	XTO ENERGY INC	1,342
13	DEVON ENERGY CORP	54	13	APACHE CORP	1,110
14	BURLINGTON RESOURCES INC	52	14	E O G RESOURCES INC	1,066
15	ANADARKO PETROLEUM CORP	52	15	DOMINION RESOURCES INC	1,040
16	MARATHON OIL CORP	50	16	EL PASO ENERGY	826
17	MERIT ENERGY CO	47	17	OCCIDENTAL OIL & GAS CORP	809
18	MURPHY OIL CORP	46	18	MARATHON OIL CORP	741
19	NOBLE ENERGY INC	37	19	WILLIAMS ENERGY INC	719
20	XTO ENERGY INC	37	20	NEWFIELD EXPLORATION CO	690
	Top 20 Volume Subtotal	***3,387***		***Top 20 Volume Subtotal***	***29,800***
	Top 20 Percentage of U.S. Total	***65%***		***Top 20 Percentage of U.S. Total***	***56%***
21	E O G RESOURCES INC	32	21	SAMSON RESOURCES CO	633
22	CITY OF LONG BEACH	31	22	PIONEER NATURAL RESOURCES	630
23	DOMINION RESOURCES INC	29	23	QUESTAR CORP	594
24	CITATION OIL & GAS CORP	28	24	NOBLE ENERGY INC	538
25	CHESAPEAKE ENERGY CORP	28	25	CIMAREX ENERGY CO	455
26	DENBURY RESOURCES INC	28	26	MERIT ENERGY CO	425
27	PIONEER NATURAL RESOURCES	25	27	ENERGEN RESOURCES CORP	303
28	HILCORP ENERGY CO	24	28	HOUSTON EXPLORATION CO	295
29	NEWFIELD EXPLORATION CO	24	29	YATES PETROLEUM CORP	282
30	POGO PRODUCING CO	23	30	AMERADA HESS CORP	264
31	WHITING PETROLEUM CORP	23	31	FOREST OIL CORP	261
32	BERRY PETROLEUM CO	21	32	POGO PRODUCING CO	259
33	ENCORE OPERATING LP	21	33	HUNT OIL CO	245
34	VINTAGE PETROLEUM INC	20	34	EQUITABLE RESOURCES INC	238
35	CIMAREX ENERGY CO	19	35	CABOT OIL & GAS CORP	230
36	FOREST OIL CORP	19	36	TOTALFINAELF SA	226
37	CONTINENTAL RESOURCES INC	19	37	HILCORP ENERGY CO	222
38	NANCE PETROLEUM CORP	19	38	ULTRA PETROLEUM INC	208
39	ENDEAVOR ENERGY RESOURCES	18	39	WALTER OIL & GAS CORP	179
40	ENI PETROLEUM CO INC	18	40	COLUMBIA NATURAL RESOURCES LLC	176
41	EL PASO ENERGY	18	41	STONE ENERGY CORP	174
42	NEXEN PETROLEUM USA INC	17	42	VINTAGE PETROLEUM INC	170
43	SWIFT ENERGY OPERATING LLC	16	43	W & T OFFSHORE INC	162
44	HENRY PETROLEUM LP	15	44	RED WILLOW PRODUCTION CO	162
45	ENERGEN RESOURCES CORP	15	45	FIDELITY EXPLORATION & PROD CO	157
46	STONE ENERGY CORP	14	46	C N X GAS CO LLC	151
47	HEADINGTON RESOURCES INC	13	47	KAISER - FRANCIS OIL CO	148
48	ENCANA CORP	12	48	KCS ENERGY INC	147
49	BREITBURN ENERGY CO LP	12	49	ENERGY PARTNERS LTD	143
50	CASTLE PEAK RESOURCES LLC	11	50	UNIT CORP	142
	Top 50 Volume Subtotal	***3,999***		***Top 50 Volume Subtotal***	***38,019***
	Top 50 Percentage of U.S. Total	***77%***		***Top 50 Percentage of U.S. Total***	***72%***

Note: Crude oil production includes production of lease condensate. Total natural gas production is wet after lease separation.

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Appendix B

Top 100 Oil and Gas Fields

Appendix B

Top 100 Oil and Gas Fields

This appendix presents estimates of the proved reserves and production of the top 100 liquids or gas fields by reserves or by production. The liquids production and reserve data include both crude oil and lease condensate, and are labeled as liquids. The total gas production and reserve data is wet after lease separation. Although there is considerable grouping of field-level statistics within the tables, rough orders of magnitude may be estimated for the proved reserves and production of most fields. They rank the top 100 fields by production (B3 and B4) rather than by reserves (B1 and B2).

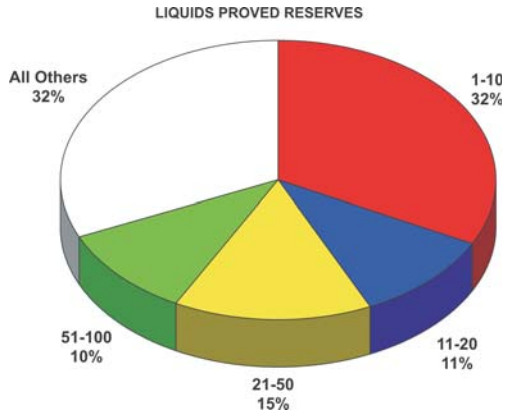
Many of the fields in the top 100 group are operated by only one or two operators, therefore, the totals for proved reserves are grouped as top 10, top 20, top 50, and top 100 to avoid revealing company proprietary data. Many of the same fields are in each of the tables B1, B2, B3, and B4. The liquids fields with the more recent Discovery dates are typically located in the Gulf of Mexico Offshore and Alaska. The gas fields with the more recent Discovery dates are located in the Gulf of Mexico Offshore, New Mexico, Colorado, and Wyoming. Blanco/Ignacio-Blanco and Basin have been combined into San Juan Basin Gas Area.

Summary for the Top 100 Fields for 2005 Liquids and Gas

Rank Group	12/31/2005 Proved Reserves	Percent	12/31/2005 Nonproducing Reserves	Percent	Estimated 2005 Production	Percent
Table B1. Top 100 U.S. Fields as Ranked by Liquids Proved Reserves (Million Barrels)						
Top 10	7,459.9	32.4%	1,818.5	29.7%	410.3	21.5%
Top 20	9,884.9	42.9%	2,430.7	39.7%	597.4	31.3%
Top 50	13,307.3	57.8%	3,399.7	55.5%	822.5	43.1%
Top 100	15,721.9	68.3%	4,298.8	70.2%	1,029.8	54.0%
Others	7,297.1	31.7%	1,822.2	29.8%	877.2	46.0%
Total	23,019.0	100.0%	6,121.0	100.0%	1,907.0	100.0%
Table B2. Top 100 U.S. Fields as Ranked by Gas Proved Reserves (Billion Cubic Feet)						
Top 10	63,050.8	29.6%	16,914.5	28.4%	4,019.3	20.9%
Top 20	81,644.4	38.3%	21,769.8	36.5%	5,414.0	28.1%
Top 50	105,810.6	49.6%	29,792.6	49.9%	7,189.1	37.3%
Top 100	124,975.2	58.6%	35,807.1	60.0%	8,614.2	44.7%
Others	88,332.8	41.4%	23,850.9	40.0%	10,644.8	55.3%
Total	213,308.0	100.0%	59,658.0	100.0%	19,259.0	100.0%
Table B3. Top 100 U.S. Fields as Ranked by Liquids Production (Million Barrels)						
Top 10	n/a	n/a	n/a	n/a	501.8	26.3%
Top 20	n/a	n/a	n/a	n/a	683.3	35.8%
Top 50	n/a	n/a	n/a	n/a	931.7	48.9%
Top 100	n/a	n/a	n/a	n/a	1,099.7	57.7%
Others	n/a	n/a	n/a	n/a	807.3	42.3%
Total	n/a	n/a	n/a	n/a	1,907.0	100.0%
Table B4. Top 100 U.S. Fields as Ranked by Gas Production (Billion Cubic Feet)						
Top 10	n/a	n/a	n/a	n/a	4,193.2	21.8%
Top 20	n/a	n/a	n/a	n/a	5,476.0	28.4%
Top 50	n/a	n/a	n/a	n/a	7,407.7	38.5%
Top 100	n/a	n/a	n/a	n/a	9,011.3	46.8%
Others	n/a	n/a	n/a	n/a	10,247.7	53.2%
Total	n/a	n/a	n/a	n/a	19,259.0	100.0%

Table B1. Top 100 Liquids Fields Ranked by Reserves

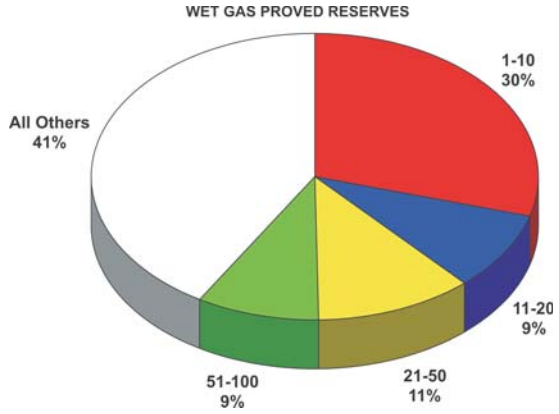
The top 100 liquids fields by reserves had 15,722 million barrels of **proved reserves** accounting for 68 percent of the total United States as of December 31, 2005, (**Table 6 and Table 14**) and 70 percent of the reported nonproducing reserves. In the top 20 liquids fields for 2005 there are five fields, which are in the deep water of the Gulf of Mexico Federal Offshore and two are currently nonproducing.



The top 100 liquids fields by reserves had 1,030 million barrels of **production**, or 54 percent of the 2005 U.S. total (**Table 6 and Table 14**). From year to year these top 100 fields change rank. The most notable change from last year is the Elm Coulee field in Montana moving to 24th in 2005.

Table B2. Top 100 Gas Fields Ranked by Reserves

The top 100 gas fields by reserves had 124,975 billion cubic feet of wet natural gas **proved reserves** or 58 percent of the total, as of December 31, 2005 (**Table 9**) and 60 percent of the reported nonproducing reserves.



The top 100 gas fields by reserves had 8,614 billion cubic feet of **production**, or 45 percent of the 2005 U.S. total (**Table 9**).

Table B3. Top 100 Liquids Fields Ranked by Production

The top 100 liquids fields by production had 1,100 million barrels of **production**, or 58 percent of the 2005 U.S. total (**Table 6 and Table 14**).

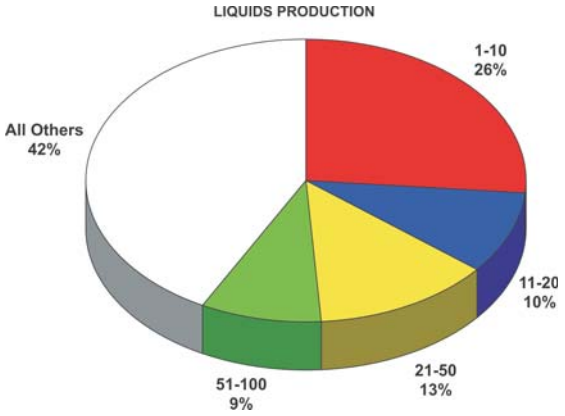
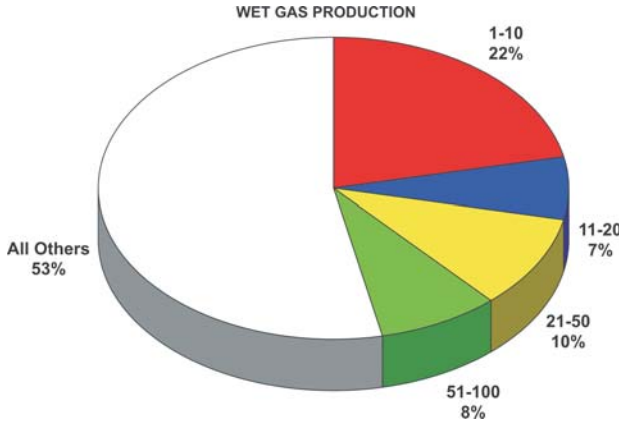


Table B4. Top 100 Gas Fields Ranked by Production

The top 100 gas fields had 9,011 billion cubic feet of **production**, or 47 percent of the 2005 U.S. total (**Table 9**).



A Quarter Century of Change

For a historical perspective of the way the largest 100 oil fields have changed over the course of 25 years, a table of the One Hundred Largest Fields as of December 31, 1979 has been added to this appendix (**Table B5**).

Table B1. Top 100 U.S. Fields Ranked by Liquids Proved Reserves from Estimated 2005 Field Level Data[a]
(Million Barrels of 42 U.S. Gallons)

Num	Field Name	Location	Discovery Year	Rank Group: Proved Reserves	Rank Group: Nonproducing Reserves	2005 Estimated Production Volume
1	PRUDHOE BAY	AK	1967	(1-10)		118.9
2	WASSON	TX	1954	(1-10)		56.2
3	KUPARUK RIVER	AK	1969	(1-10)		47.7
4	BELRIDGE SOUTH	CA	1911	(1-10)		37.4
5	MISSISSIPPI CANYON BLK 778 (THUNDER HORSE)	FG	1999	(1-10)		0.0
6	MISSISSIPPI CANYON BLK 807 (MARS-URSA)	FG	1989	(1-10)		67.0
7	SPRABERRY TREND AREA	TX	1952	(1-10)		22.7
8	MIDWAY-SUNSET	CA	1901	(1-10)		42.4
9	GREEN CANYON BLK 699 (ATLANTIS)	FG	1998	(1-10)		0.0
10	ELK HILLS	CA	1919	(1-10)		18.1
Top 10 Volume Subtotal				**7,459.9**	**1,818.5**	**410.3**
Top 10 Percentage of U.S. Total				**32.4%**	**29.7%**	**21.5%**
11	KERN RIVER	CA	1899	(1-10)		33.0
12	SLAUGHTER	TX	1937	(1-10)		13.0
13	ALPINE	AK	1994	(1-10)		42.9
14	MILNE POINT	AK	1982	(1-10)		16.0
15	GREEN CANYON BLK 644 (HOLSTEIN)	FG	1999	(1-10)		16.6
16	CEDAR HILLS	ND & MT & SD	1951	(1-10)		22.6
17	GREEN CANYON BLK 826 (MAD DOG)	FG	1999	(1-10)		8.6
18	WATTENBERG	CO	1970	(1-10)		10.9
19	LEVELLAND	TX	1945	(1-10)		8.4
20	WILMINGTON	CA	1935	(1-10)		15.0
Top 20 Volume Subtotal				**9,884.9**	**2,430.7**	**597.4**
Top 20 Percentage of U.S. Total				**42.9%**	**39.7%**	**31.3%**
21	CYMRIC	CA	1916	(1-10)		18.5
22	SALT CREEK	WY	1917	(1-10)		2.4
23	LOST HILLS	CA	1910	(1-10)		11.4
24	ELM COULEE	MT	2000	(1-10)		15.9
25	GREEN CANYON BLK 640 (TAHITI)	FG	2002	(1-10)		0.0
26	HONDO	FP	1969	(1-10)		6.2
27	WEST SAK	AK	1969	(1-10)		4.4
28	PESCADO	FP	1970	(1-10)		4.9
29	YATES	TX	1984	(1-10)		8.9
30	SHO-VEL-TUM	OK	1905	(1-10)		8.1
31	HOBBS	NM	1928	(1-10)		4.8
32	COWDEN NORTH	TX	1930	(1-10)		6.0
33	NORTHSTAR	AK	1984	(1-10)		22.8
34	MISSISSIPPI CANYON BLK 84 (KING/HORN MT)	FG	1993	(1-10)		22.5
35	KELLY-SNYDER	TX	1948	(1-10)		11.8
36	POINT MCINTYRE	AK	1988	(1-10)		12.3
37	INGLEWOOD	CA	1924	(1-10)		2.9
38	GOLDSMITH	TX	1946	(1-10)		5.1
39	SACATE	FP	1970	(1-10)		3.9
40	ORION	AK	2002	(1-10)		2.8
41	SAN ARDO	CA	1947	(1-10)		3.5
42	ENDICOTT	AK	1978	(1-10)		6.5
43	VACUUM	NM	1929	(1-10)		7.2
44	PINEDALE	WY	1955	(1-10)		3.5
45	SEMINOLE	TX	1936	(1-10)		8.4
46	VENTURA	CA	1916	(1-10)		3.9
47	GREATER ANETH	UT	1956	(1-10)		3.6
48	BOREALIS	AK	2001	(1-10)		7.0
49	FULLERTON	TX	1942	(1-10)		4.5
50	WARD-ESTES NORTH	TX	1927	(1-10)		1.4
Top 50 Volume Subtotal				**13,307.3**	**3,399.7**	**822.5**
Top 50 Percentage of U.S. Total				**57.8%**	**55.5%**	**43.1%**

Table B1. Top 100 U.S. Fields Ranked by Liquids Proved Reserves from Estimated 2005 Field Level Data[a] (Continued)
(Million Barrels of 42 U.S. Gallons)

Num	Field Name	Location	Discovery Year	Rank Group: Proved Reserves	Rank Group: Nonproducing Reserves	2005 Estimated Production Volume
51	ROBERTSON NORTH	TX	1956	(51-100)		4.1
52	MONUMENT BUTTE	UT	1964	(51-100)		3.4
53	MCELROY	TX	1926	(51-100)		4.9
54	GREEN CANYON BLK 339 (FRONT RUNNER)	FG	2001	(51-100)		8.4
55	HAWKINS	TX	1940	(51-100)		2.5
56	GREEN CANYON BLK 562 (K2)	FG	1999	(51-100)		1.6
57	MISSISSIPPI CANYON BLK 383 (KEPLER)	FG	1987	(51-100)		33.6
58	BELRIDGE NORTH	CA	1912	(51-100)		3.7
59	SALT CREEK	TX	1968	(51-100)		4.9
60	PENNEL	MT	1955	(51-100)		1.9
61	RANGELY	CO	1902	(51-100)		5.2
62	GREEN CANYON BLK 680 (CONSTITUTION)	FG	2001	(51-100)		0.0
63	WESTBROOK	TX	1920	(51-100)		2.5
64	LAKE WASHINGTON	LA	1931	(51-100)		6.2
65	ARROYO GRANDE	CA	1906	(51-100)		0.6
66	MISSISSIPPI CANYON BLK 20	FG	1982	(51-100)		0.0
67	COALINGA	CA	1887	(51-100)		5.9
68	MISSISSIPPI CANYON BLK 696 (BLIND FAITH)	FG	2001	(51-100)		0.0
69	JAY	AL & FL	1951	(51-100)		1.9
70	POSTLE	OK	1958	(51-100)		1.6
71	GIDDINGS	TX	1960	(51-100)		8.2
72	LISBURNE	AK	1967	(51-100)		2.9
73	ATWATER VALLEY BLK 575 (NEPTUNE (AT))	FG	1995	(51-100)		0.0
74	MEANS	TX	1934	(51-100)		3.5
75	MISSISSIPPI CANYON BLK 773 (DEVILS TOWER)	FG	2000	(51-100)		5.4
76	CEDAR LAKE	TX	1939	(51-100)		2.5
77	VIOSCA KNOLL BLK 786 (PETRONIUS)	FG	1996	(51-100)		12.2
78	AURORA	AK	1969	(51-100)		3.3
79	HOWARD-GLASSCOCK	TX	1925	(51-100)		2.8
80	ANTON-IRISH	TX	1944	(51-100)		4.1
81	TARN	AK	1991	(51-100)		8.1
82	WASSON 72	TX	1940	(51-100)		2.5
83	KERN FRONT	CA	1925	(51-100)		1.5
84	FUHRMAN-MASCHO	TX	1930	(51-100)		2.4
85	ALTAMONT-BLUEBELL	UT	1949	(51-100)		2.9
86	POLARIS	AK	2000	(51-100)		1.3
87	GREEN CANYON BLK 654 (SHENZI)	FG	2003	(51-100)		0.0
88	MISSISSIPPI CANYON BLK 582 (MEDUSA)	FG	2000	(51-100)		8.7
89	GOLDEN TREND	OK	1945	(51-100)		2.0
90	EWING BANK BLK 873 (LOBSTER/OYSTER)	FG	1991	(51-100)		8.1
91	GREEN CANYON BLK 518 (K2)	FG	1999	(51-100)		0.0
92	GARDEN BANKS BLK 171 (SALSA)	FG	1988	(51-100)		7.6
93	EAST TEXAS	TX	1930	(51-100)		4.5
94	EAST BREAKS BLK 602 (NANSEN)	FG	1999	(51-100)		9.1
95	FULLER	TX	1951	(51-100)		0.7
96	FOSTER	TX	1984	(51-100)		2.3
97	PATRICK DRAW	WY	1959	(51-100)		0.6
98	DOLLARHIDE	NM & TX	1945	(51-100)		2.9
99	WELCH	TX	1981	(51-100)		1.7
100	JONAH	WY	1977	(51-100)		2.6
Top 100 Volume Subtotal				**15,721.9**	**4,298.8**	**1,029.8**
Top 100 Percentage of U.S. Total				**68.3%**	**70.2%**	**54.0%**

[a]Includes lease condensate.

Notes: The U.S. total production estimate of 1,907 million barrels and the U.S. total reserves estimate of 23,019 million barrels, used to calculate the percentages in this table, are from the combined totals of Table 6 and Table 15 in this publication. Column totals may not add due to independent rounding.

FP = Federal Offshore Pacific.

FG = Federal Offshore Gulf of Mexico.

Source: Energy Information Administration, Office of Oil and Gas.

Table B2. Top 100 U.S. Fields Ranked by Gas Proved Reserves from Estimated 2005 Field Level Data[a]
(Billion Cubic Feet)

Num	Field Name	Location	Discovery Year	Rank Group: Proved Reserves	Rank Group: Nonproducing Reserves	2005 Estimated Production Volume
1	SAN JUAN BASIN GAS AREA	CO & NM	1927	(1-10)		1397.0
2	PINEDALE	WY	1955	(1-10)		457.3
3	NEWARK EAST	TX	2002	(1-10)		496.5
4	HUGOTON GAS AREA	KS & OK & TX	1922	(1-10)		480.7
5	PRUDHOE BAY	AK	1967	(1-10)		193.0
6	JONAH	WY	1977	(1-10)		273.1
7	WATTENBERG	CO	1970	(1-10)		179.1
8	MADDEN	WY	1968	(1-10)		163.7
9	ANTRIM	MI	1965	(1-10)		164.9
10	CARTHAGE	TX	1981	(1-10)		214.1
Top 10 Volume Subtotal				**63,050.8**	**16,914.5**	**4,019.3**
Top 10 Percentage of U.S. Total				**29.6%**	**28.4%**	**20.9%**
11	RATON BASIN GAS AREA	CO & NM	1998	(11-20)		120.9
12	NATURAL BUTTES	UT	1940	(11-20)		133.6
13	PRB COALBED	WY	1992	(11-20)		336.1
14	VERNON	LA	1967	(11-20)		115.1
15	LOWER MOBILE BAY AREA	AL & FG	1979	(11-20)		139.1
16	SPRABERRY TREND AREA	TX	1952	(11-20)		78.7
17	SAWYER	TX	1960	(11-20)		75.1
18	ELK HILLS	CA	1919	(11-20)		136.2
19	FOGARTY CREEK	WY	1975	(11-20)		166.4
20	ELM GROVE	LA	1916	(11-20)		93.6
Top 20 Volume Subtotal				**81,644.4**	**21,769.8**	**5,414.0**
Top 20 Percentage of U.S. Total				**38.3%**	**36.5%**	**28.1%**
21	OAKWOOD	VA	1990	(21-50)		54.5
22	GRAND VALLEY	CO	1985	(21-50)		63.0
23	BIG SANDY	KY & WV	1926	(21-50)		45.6
24	MAMM CREEK	CO	1959	(21-50)		95.5
25	MISSISSIPPI CANYON BLK 807 (MARS-URSA)	FG	1989	(21-50)		93.2
26	OAK HILL	TX	1958	(21-50)		97.9
27	WASSON	TX	1954	(21-50)		78.1
28	PARACHUTE	CO	1985	(21-50)		51.3
29	STRONG CITY DISTRICT	OK	1966	(21-50)		81.5
30	RULISON	CO	1958	(21-50)		54.7
31	BALD PRAIRIE	TX	1976	(21-50)		54.5
32	FARRAR	TX	2002	(21-50)		53.2
33	GOLDEN TREND	OK	1945	(21-50)		41.4
34	HALEY	TX	1983	(21-50)		43.2
35	LAKE RIDGE	WY	1981	(21-50)		17.6
36	RED OAK-NORRIS	OK	1910	(21-50)		57.1
37	OAKS	TX	1975	(21-50)		36.5
38	FREESTONE	TX	1949	(21-50)		80.9
39	DRUNKARDS WASH	UT	1989	(21-50)		62.1
40	MOCANE-LAVERNE GAS AREA	KS & OK & TX	1946	(21-50)		64.0
41	MAYFIELD NE	OK	1951	(21-50)		105.4
42	PANOMA GAS AREA	KS	1956	(21-50)		71.7
43	GIDDINGS	TX	1960	(21-50)		106.0
44	BELUGA RIVER	AK	1962	(21-50)		61.2
45	BUFFALO WALLOW	TX	1969	(21-50)		51.5
46	WATONGA-CHICKASHA TREND	OK	1948	(21-50)		50.0
47	OVERTON	TX	1973	(21-50)		49.0
48	STANDARD DRAW	WY	1979	(21-50)		22.5
49	HONDO	FP	1969	(21-50)		18.0
50	PINON	TX	1982	(21-50)		14.4
Top 50 Volume Subtotal				**105,810.6**	**29,792.6**	**7,189.1**
Top 50 Percentage of U.S. Total				**49.6%**	**49.9%**	**37.3%**

Table B2. Top 100 U.S. Fields Ranked by Gas Proved Reserves from Estimated 2005 Field Level Data[a] (Continued)
(Billion Cubic Feet)

Num	Field Name	Location	Discovery Year	Rank Group: Proved Reserves	Rank Group: Nonproducing Reserves	2005 Estimated Production Volume
51	KINTA	OK	1914	(51-100)		45.7
52	SLIGO	LA	1922	(51-100)		46.6
53	STILES RANCH	TX	1978	(51-100)		24.3
54	DEW	TX	1982	(51-100)		38.2
55	DOWDY RANCH	TX	1999	(51-100)		41.7
56	GOMEZ	TX	1963	(51-100)		43.3
57	MISSISSIPPI CANYON BLK 383 (KEPLER)	FG	1987	(51-100)		0.0
58	WAMSUTTER	WY	1997	(51-100)		30.1
59	COOK INLET NORTH	AK	1962	(51-100)		44.5
60	SHO-VEL-TUM	OK	1905	(51-100)		31.1
61	ECHO SPRINGS	WY	1976	(51-100)		30.8
62	PICEANCE CREEK	CO	1930	(51-100)		5.9
63	MISSISSIPPI CANYON BLK 778 (THUNDER HORSE)	FG	1999	(51-100)		0.0
64	CEDARDALE NE	OK	1957	(51-100)		27.2
65	BEAR GRASS	TX	1977	(51-100)		27.6
66	EAST BREAKS BLK 602 (NANSEN)	FG	1999	(51-100)		67.3
67	TEAGUE	TX	1945	(51-100)		30.5
68	NORA	VA	1949	(51-100)		2.7
69	WILD ROSE	WY	1975	(51-100)		24.4
70	ELK CITY	OK	1947	(51-100)		30.1
71	VERDEN	OK	1948	(51-100)		27.5
72	MIMMS CREEK	TX	1978	(51-100)		47.1
73	BRUFF	WY	1969	(51-100)		33.5
74	EXSUN	TX	1974	(51-100)		43.1
75	OZONA NE	TX	1966	(51-100)		24.7
76	WILBURTON	OK	1941	(51-100)		34.7
77	KUPARUK RIVER	AK	1969	(51-100)		6.6
78	NACONICHE CREEK	TX	1978	(51-100)		9.7
79	OZONA	TX	1962	(51-100)		23.1
80	VAQUILLAS RANCH	TX	1978	(51-100)		45.6
81	BETHANY	TX	1921	(51-100)		29.0
82	WAYNOKA NE	OK	1956	(51-100)		18.5
83	CHEYENNE WEST	OK	1971	(51-100)		35.6
84	HOLLY	LA	1928	(51-100)		22.1
85	WILLOW SPRINGS	TX	1938	(51-100)		27.8
86	MOBILE BLK 823	FG	1983	(51-100)		23.9
87	MINDEN	TX	1954	(51-100)		20.7
88	BROWN-BASSETT	TX	1953	(51-100)		26.4
89	BOONSVILLE	TX	1945	(51-100)		27.1
90	HUXLEY	TX	1946	(51-100)		15.2
91	CASPIANA	LA	1925	(51-100)		14.9
92	MISSISSIPPI CANYON BLK 731 (MENSA)	FG	1987	(51-100)		54.1
93	CHARCO	TX	1948	(51-100)		29.9
94	CEMENT	OK	1916	(51-100)		34.1
95	EAKLY-WEATHERFORD TREND	OK	1953	(51-100)		21.0
96	GOLDSMITH	TX	1946	(51-100)		16.6
97	VIOSCA KNOLL BLK 956 (RAM-POWELL)	FG	1985	(51-100)		71.1
98	STRATTON	TX	1937	(51-100)		18.4
99	BLOCKER	TX	1954	(51-100)		13.7
100	DAVIDSON RANCH	TX	1964	(51-100)		17.4
Top 100 Volume Subtotal				**124,975.2**	**35,807.1**	**8,614.2**
Top 100 Percentage of U.S. Total				**58.6%**	**60.0%**	**44.7%**

[a]Total wet gas after lease separation.

Note: The U.S. total production estimate of 19,259 billion cubic feet and the U.S. total reserves estimate of 213,308 billion cubic feet, used to calculate the percentages in this table, are from Table 9 in this publication. Column totals may not add due to independent rounding.

FP = Federal Offshore Pacific.

FG = Federal Offshore Gulf of Mexico.

Source: Energy Information Administration, Office of Oil and Gas.

Table B3. Top 100 U.S. Fields Ranked by Liquids Production from Estimated 2005 Field Level Data[a]
(Million Barrels of 42 U.S. Gallons)

Num	Field Name	Location	Discovery Year	2005 Estimated Production Volume
1	PRUDHOE BAY	AK	1967	118.9
2	MISSISSIPPI CANYON BLK 807 (MARS-URSA)	FG	1989	67.0
3	WASSON	TX	1954	56.2
4	KUPARUK RIVER	AK	1969	47.7
5	ALPINE	AK	1994	42.9
6	MIDWAY-SUNSET	CA	1901	42.4
7	BELRIDGE SOUTH	CA	1911	37.4
8	MISSISSIPPI CANYON BLK 383 (KEPLER)	FG	1987	33.6
9	KERN RIVER	CA	1899	33.0
10	NORTHSTAR	AK	1984	22.8
Top 10 Volume Subtotal				**501.8**
Top 10 Percentage of U.S. Total				**26.3%**
11	SPRABERRY TREND AREA	TX	1952	22.7
12	CEDAR HILLS	ND & MT & SD	1951	22.6
13	MISSISSIPPI CANYON BLK 84 (KING/HORN MT)	FG	1993	22.5
14	CYMRIC	CA	1916	18.5
15	ELK HILLS	CA	1919	18.1
16	GREEN CANYON BLK 644 (HOLSTEIN)	FG	1999	16.6
17	MILNE POINT	AK	1982	16.0
18	ELM COULEE	MT	2000	15.9
19	WILMINGTON	CA	1935	15.0
20	GARDEN BANKS BLK 387 (LLANO)	FG	1990	13.5
Top 20 Volume Subtotal				**683.3**
Top 20 Percentage of U.S. Total				**35.8%**
21	SLAUGHTER	TX	1937	13.0
22	POINT MCINTYRE	AK	1988	12.3
23	VIOSCA KNOLL BLK 786 (PETRONIUS)	FG	1996	12.2
24	KELLY-SNYDER	TX	1948	11.8
25	LOST HILLS	CA	1910	11.4
26	WATTENBERG	CO	1970	10.9
27	GARDEN BANKS BLK 783 (MAGNOLIA)	FG	1999	9.3
28	EAST BREAKS BLK 602 (NANSEN)	FG	1999	9.1
29	YATES	TX	1984	8.9
30	MISSISSIPPI CANYON BLK 582 (MEDUSA)	FG	2000	8.7
31	GREEN CANYON BLK 826 (MAD DOG)	FG	1999	8.6
32	GREEN CANYON BLK 339 (FRONT RUNNER)	FG	2001	8.4
33	SEMINOLE	TX	1936	8.4
34	LEVELLAND	TX	1945	8.4
35	GIDDINGS	TX	1960	8.2
36	SHO-VEL-TUM	OK	1905	8.1
37	EWING BANK BLK 873 (LOBSTER/OYSTER)	FG	1991	8.1
38	TARN	AK	1991	8.1
39	GARDEN BANKS BLK 171 (SALSA)	FG	1988	7.6
40	VACUUM	NM	1929	7.2
41	BOREALIS	AK	2001	7.0
42	ENDICOTT	AK	1978	6.5
43	HONDO	FP	1969	6.2
44	LAKE WASHINGTON	LA	1931	6.2
45	GARDEN BANKS BLK 668 (GUNNISON)	FG	2000	6.1
46	COWDEN NORTH	TX	1930	6.0
47	COALINGA	CA	1887	5.9
48	MISSISSIPPI CANYON BLK 773 (DEVILS TOWER)	FG	2000	5.4
49	ALAMINOS CANYON BLK 25 (HOOVER)	FG	1997	5.3
50	GREEN CANYON BLK 158 (BRUTUS)	FG	1992	5.3
Top 50 Volume Subtotal				**931.7**
Top 50 Percentage of U.S. Total				**48.9%**

Table B3. Top 100 U.S. Fields Ranked by Liquids Production from Estimated 2005 Field Level Data[a] (Continued)
(Million Barrels of 42 U.S. Gallons)

Num	Field Name	Location	Discovery Year	2005 Estimated Production Volume
51	RANGELY	CO	1902	5.2
52	GOLDSMITH	TX	1946	5.1
53	SALT CREEK	TX	1968	4.9
54	MCELROY	TX	1926	4.9
55	PESCADO	FP	1970	4.9
56	HOBBS	NM	1928	4.8
57	MAIN PASS BLK 61	FG	2001	4.6
58	GREEN CANYON BLK 243 (ASPEN)	FG	2001	4.5
59	EAST TEXAS	TX	1930	4.5
60	FULLERTON	TX	1942	4.5
61	WEST SAK	AK	1969	4.4
62	ROBERTSON NORTH	TX	1956	4.1
63	ANTON-IRISH	TX	1944	4.1
64	VENTURA	CA	1916	3.9
65	SACATE	FP	1970	3.9
66	EUGENE IS BLK 330	FG	1971	3.9
67	BELRIDGE NORTH	CA	1912	3.7
68	GREATER ANETH	UT	1956	3.6
69	PINEDALE	WY	1955	3.5
70	VIOSCA KNOLL BLK 990 (POMPANO)	FG	1981	3.5
71	SAN ARDO	CA	1947	3.5
72	MEANS	TX	1934	3.5
73	MONUMENT BUTTE	UT	1964	3.4
74	AURORA	AK	1969	3.3
75	NIAKUK	AK	1984	3.0
76	INGLEWOOD	CA	1924	2.9
77	ALTAMONT-BLUEBELL	UT	1949	2.9
78	DOLLARHIDE	NM & TX	1945	2.9
79	LISBURNE	AK	1967	2.9
80	MCARTHUR RIVER	AK	1965	2.8
81	HOWARD-GLASSCOCK	TX	1925	2.8
82	ORION	AK	2002	2.8
83	OREGON BASIN	WY	1912	2.7
84	JONAH	WY	1977	2.6
85	JO-MILL	TX	1953	2.6
86	MCKITTRICK	CA	1887	2.6
87	GRAYBURG JACKSON	NM	1929	2.6
88	CEDAR HILLS	MT	1951	2.6
89	POINT PEDERNALES	FP	1983	2.5
90	WASSON 72	TX	1940	2.5
91	WESTBROOK	TX	1920	2.5
92	BROOKELAND	TX	1962	2.5
93	HUNTINGTON BEACH	CA	1964	2.5
94	HAWKINS	TX	1940	2.5
95	CEDAR LAKE	TX	1939	2.5
96	WEST DELTA BLK 30	FG	1949	2.4
97	FUHRMAN-MASCHO	TX	1930	2.4
98	SALT CREEK	WY	1917	2.4
99	SHIP SHOAL BLK 169	FG	1960	2.3
100	VIOSCA KNOLL BLK 825 (NEPTUNE)	FG	1988	2.3
Top 100 Volume Subtotal				**1,099.7**
Top 100 Percentage of U.S. Total				**57.7%**

[a]Includes lease condensate.

Notes: The U.S. total production estimate of 1,907 million barrels. used to calculate the percentages in this table, are from the combined totals of Table 6 and Table 15 in this publication. Column totals may not add due to independent rounding.

FP = Federal Offshore Pacific.

FG = Federal Offshore Gulf of Mexico.

Source: Energy Information Administration, Office of Oil and Gas.

Table B4. Top 100 U.S. Fields Ranked by Gas Production from Estimated 2005 Field Level Data[a]
(Billion Cubic Feet)

Num	Field Name	Location	Discovery Year	2005 Estimated Production Volume
1	SAN JUAN BASIN GAS AREA	CO & NM	1927	1,397.0
2	NEWARK EAST	TX	2002	496.5
3	HUGOTON GAS AREA	KS & OK & TX	1922	480.7
4	PINEDALE	WY	1955	457.3
5	PRB COALBED	WY	1992	336.1
6	JONAH	WY	1977	273.1
7	CARTHAGE	TX	1981	214.1
8	PRUDHOE BAY	AK	1967	193.0
9	WATTENBERG	CO	1970	179.1
10	FOGARTY CREEK	WY	1975	166.4
Top 10 Volume Subtotal				**4,193.2**
Top 10 Percentage of U.S. Total				**21.8%**
11	ANTRIM	MI	1965	164.9
12	MADDEN	WY	1968	163.7
13	LOWER MOBILE BAY AREA	AL & FG	1979	139.1
14	ELK HILLS	CA	1919	136.2
15	NATURAL BUTTES	UT	1940	133.6
16	RATON BASIN GAS AREA	CO & NM	1998	120.9
17	VERNON	LA	1967	115.1
18	GIDDINGS	TX	1960	106.0
19	MAYFIELD NE	OK	1951	105.4
20	OAK HILL	TX	1958	97.9
Top 20 Volume Subtotal				**5,476.0**
Top 20 Percentage of U.S. Total				**28.4%**
21	MAMM CREEK	CO	1959	95.5
22	ELM GROVE	LA	1916	93.6
23	MISSISSIPPI CANYON BLK 807 (MARS-URSA)	FG	1989	93.2
24	STRONG CITY DISTRICT	OK	1966	81.5
25	FREESTONE	TX	1949	80.9
26	SPRABERRY TREND AREA	TX	1952	78.7
27	WASSON	TX	1954	78.1
28	SAWYER	TX	1960	75.1
29	INDIAN BASIN	NM	1963	73.0
30	PANOMA GAS AREA	KS	1956	71.7
31	VIOSCA KNOLL BLK 956 (RAM-POWELL)	FG	1985	71.1
32	EAST BREAKS BLK 602 (NANSEN)	FG	1999	67.3
33	MOCANE-LAVERNE GAS AREA	KS & OK & TX	1946	64.0
34	GRAND VALLEY	CO	1985	63.0
35	DRUNKARDS WASH	UT	1989	62.1
36	BELUGA RIVER	AK	1962	61.2
37	RED OAK-NORRIS	OK	1910	57.1
38	RULISON	CO	1958	54.7
39	OAKWOOD	VA	1990	54.5
40	BALD PRAIRIE	TX	1976	54.5
41	MISSISSIPPI CANYON BLK 731 (MENSA)	FG	1987	54.1
42	FARRAR	TX	2002	53.2
43	BUFFALO WALLOW	TX	1969	51.5
44	YATES	TX	1984	51.3
45	PARACHUTE	CO	1985	51.3
46	WATONGA-CHICKASHA TREND	OK	1948	50.0
47	OVERTON	TX	1973	49.0
48	SAVELL	TX	1997	47.3
49	MIMMS CREEK	TX	1978	47.1
50	SLIGO	LA	1922	46.6
Top 50 Volume Subtotal				**7,407.7**
Top 50 Percentage of U.S. Total				**38.5%**

Table B4. Top 100 U.S. Fields Ranked by Gas Production from Estimated 2005 Field Level Data[a] (Continued)
(Billion Cubic Feet)

Num	Field Name	Location	Discovery Year	2005 Estimated Production Volume
51	KINTA	OK	1914	45.7
52	VAQUILLAS RANCH	TX	1978	45.6
53	BIG SANDY	KY & WV	1926	45.6
54	COOK INLET NORTH	AK	1962	44.5
55	LA PERLA	TX	1999	44.3
56	GOMEZ	TX	1963	43.3
57	HALEY	TX	1983	43.2
58	EXSUN	TX	1974	43.1
59	DOWDY RANCH	TX	1999	41.7
60	GOLDEN TREND	OK	1945	41.4
61	DEW	TX	1982	38.2
62	OAKS	TX	1975	36.5
63	CHEYENNE WEST	OK	1971	35.6
64	GARDEN BANKS BLK 668 (GUNNISON)	FG	2000	35.2
65	WILBURTON	OK	1941	34.7
66	CEMENT	OK	1916	34.1
67	HAYNES	TX	1999	34.0
68	BRUFF	WY	1969	33.5
69	MISSISSIPPI CANYON BLK 657 (COULOMB)	FG	1988	33.1
70	PANOLA	OK	1964	31.6
71	GARDEN BANKS BLK 877 (RED HAWK)	FG	2003	31.3
72	SHO-VEL-TUM	OK	1905	31.1
73	ECHO SPRINGS	WY	1976	30.8
74	TEAGUE	TX	1945	30.5
75	ELK CITY	OK	1947	30.1
76	BLOCK 31	TX	1945	30.1
77	WAMSUTTER	WY	1997	30.1
78	CHARCO	TX	1948	29.9
79	BETHANY	TX	1921	29.0
80	LAKE PASTURE	TX	1939	28.5
81	SOONER TREND	OK	1942	28.4
82	GARDEN BANKS BLK 171 (SALSA)	FG	1988	28.2
83	WILLOW SPRINGS	TX	1938	27.8
84	BEAR GRASS	TX	1977	27.6
85	VERDEN	OK	1948	27.5
86	CEDARDALE NE	OK	1957	27.2
87	BOONSVILLE	TX	1945	27.1
88	JUDGE DIGBY	LA	1977	27.0
89	BROWN-BASSETT	TX	1953	26.4
90	ADA	LA	1944	26.3
91	AMACKER-TIPPETT	TX	1953	25.7
92	KNOX	OK	1916	25.4
93	LOS MOGOTES	TX	1960	25.1
94	OZONA NE	TX	1966	24.7
95	WILD ROSE	WY	1975	24.4
96	STILES RANCH	TX	1978	24.3
97	MOBILE BLK 823	FG	1983	23.9
98	CEDAR CREEK	ND	1929	23.8
99	BOONEVILLE	AR	1958	23.6
100	OZONA	TX	1962	23.1
Top 100 Volume Subtotal				**9,011.3**
Top 100 Percentage of U.S. Total				**46.8%**

[a]Total wet gas after lease separation.

Note: The U.S. total production estimate of 19,259 billion cubic feet, used to calculate the percentages in this table, are from Table 9 in this publication. Column totals may not add due to independent rounding.

FP = Federal Offshore Pacific.

FG = Federal Offshore Gulf of Mexico.

Source: Energy Information Administration, Office of Oil and Gas.

Table B5. The One Hundred Largest Fields in the U.S. as of December 31, 1979
(Thousands of barrels of 42 U.S. Gallons)

Rank	Field	Location	Year of Discovery	Cumulative Production 12/31/79	Proved Crude Oil Reserves 12/31/79	Original-Oil-In-Place Estimated 12/31/79
1	Prudhoe Bay	Alaska	1968	982,397	8,417,603	23,800,000
2	Yates	Texas District 8	1926	769,050	1,230,950	4,000,000
3	East Texas	Texas District 6	1930	4,635,076	964,924	7,000,000
4	Wasson	Texas District 8A	1936	1,301,678	599,402	4,747,792
5	Elk Hills	Cal.-San Joaquin	1919	435,874	576,506	2,780,321
6	Kern River	Cal.-San Joaquin	1899	793,365	436,635	4,062,000
7	Wilmington	Cal.-Los Angeles	1936	1,952,447	424,553	9,693,100
8	Midway-Sunset	Cal.-San Joaquin	1901	1,423,402	406,398	6,190,000
9	Kuparuk River	Alaska	1969	0	320,000	3,200,000
10	Slaughter	Texas District 8A	1936	798,413	276,487	1,810,000
Top 10 Total				**13,091,702**	**13,653,458**	**67,283,213**
Top 10 Percentage of U.S.				**10.8%**	**50.5%**	**14.6%**
11	Sho-Vel-Tum	Oklahoma	1915	1,143,712	229,730	3,100,000
12	Seminole	Texas District 8A	1936	308,661	227,683	1,148,180
13	Kelly-Snyder	Texas District 8A	1948	1,053,195	212,877	2,160,886
14	Tom O'Connor	Texas District 2	1934	604,245	195,206	1,376,019
15	Beta	Cal.-Los Angeles	1977	0	150,000	625,000
16	Belridge South	Cal.-San Joaquin	1911	262,054	137,946	1,400,000
17	Levelland	Texas District 8A	1945	313,690	131,110	1,012,000
18	Hastings, West	Texas District 3	1934	519,570	130,796	925,129
19	South Pass, Block 61	Louisiana-South	1968	58,188	126,873	456,900
20	Panhandle	Texas District 10	1921	1,333,374	116,626	6,060,000
Top 20 Total				**18,688,391**	**15,312,305**	**85,547,327**
Top 20 Percentage of U.S.				**15.5%**	**56.6%**	**18.6%**
21	Hawkins	Texas District 6	1940	699,323	108,945	1,355,909
22	San Ardo	Cal.-Coastal	1947	336,788	103,212	1,450,000
23	Rangely	Colorado	1902	615,898	100,369	1,681,575
24	Cowden, North	Texas District 8	1930	355,690	95,005	1,208,750
25	Hondo	Cal.-Coastal	1969	0	94,000	606,300
26	McArthur River	Alaska	1965	418,926	92,074	1,336,000
27	Conroe	Texas District 3	1931	642,022	91,360	1,206,568
28	Tule Elk	Cal.-San Joaquin	1973	1,861	88,139	300,000
29	South Pass, Block 27	Louisiana-South	1954	298,320	85,747	880,650
30	Miss. Canyon, Block 194	Louisiana-South	1975	915	84,363	189,935
31	Spraberry Trend	Texas Dist. 7C, 8, 8A	1949	485,814	83,328	8,888,250
32	Jay	Florida & Alabama	1970	262,917	83,022	728,292
33	Mount Poso	Cal.-San Joaquin	1926	194,151	82,099	498,750
34	Bay Marchand, Block 2	Louisiana-South	1949	533,545	80,809	1,570,571
35	Fullerton	Texas District 8	1941	257,973	78,814	1,329,410
36	Santa Clara Offshore	Cal.-Coastal	1973	0	78,500	349,000
37	Eugene Is., Block 330	Louisiana-South	1971	167,970	76,361	485,713
38	Huntington Beach	Cal.-Los Angeles	1920	990,674	74,326	6,000,000
39	So. Marsh Is., Block 130	Louisiana-South	1973	25,758	70,205	202,000
40	Salt Creek	Texas District 8A	1950	178,486	69,514	471,000
41	Salt Creek & S. Salt Creek	Wyoming	1906	576,534	66,626	1,517,580
42	Vacuum	New Mexico	1929	318,925	62,539	1,425,726
43	Oregon Basin	Wyoming	1927	296,371	62,075	905,600
44	Hobbs	New Mexico	1928	248,927	59,923	841,469
45	Ventura	Cal.-Coastal	1917	841,842	58,158	3,500,000
46	Dos Cuadras	Cal.-Coastal	1968	158,359	56,641	750,000
47	Delhi	Louisiana-North	1944	193,577	55,956	467,178
48	Elk Basin	Wyo. & Mont.	1915	467,343	55,847	997,601
49	South Pass, Block 24	Louisiana-South	1950	419,229	55,082	1,004,672
50	Ship Shoal, Block 207	Louisiana-South	1967	69,381	54,259	287,779
Top 50 Total				**28,745,910**	**17,619,603**	**127,983,605**
Top 50 Percentage of U.S.				**23.8%**	**65.1%**	**27.8%**

Table B5. The One Hundred Largest Fields in the U.S. as of December 31, 1979 (Continued)
(Thousands of barrels of 42 U.S. Gallons)

Rank	Field	Location	Year of Discovery	Cumulative Production 12/31/79	Proved Crude Oil Reserves 12/31/79	Original-Oil-In-Place Estimated 12/31/79
51	Sooner Trend	Oklahoma	1942	238,713	53,617	1,202,778
52	Anton Irish	Texas District 8A	1944	124,390	53,610	450,000
53	Midland Farms	Texas District 8	1945	179,620	52,891	719,550
54	Coalinga	Cal.-San Joaquin	1887	662,299	51,701	4,505,000
55	Goldsmith	Texas District 8	1934	579,930	49,357	1,823,130
56	Thompson	Texas District 3	1931	337,750	49,141	732,052
57	Wichita County Regular	Texas District 9	1910	525,650	48,350	2,000,000
58	Lost Soldier-Wertz	Wyoming	1916	241,247	48,323	663,877
59	Howard Glasscock	Texas District 8	1925	341,009	47,726	1,421,100
60	Diamond M	Texas District 8A	1948	221,747	45,991	616,510
61	Grand Isle, Block 43	Louisiana-South	1956	227,539	45,599	483,437
62	Eunice	New Mexico	1929	334,198	44,601	2,000,260
63	Main Pass, Block 41	Louisiana-South	1957	176,209	41,676	453,990
64	Neches	Texas District 6	1953	81,040	40,984	198,073
65	Granite Point	Alaska	1965	79,135	38,865	413,000
66	Talco	Texas District 6	1936	251,984	38,016	739,000
67	Painter Reservoir	Wyoming	1977	1,848	37,652	132,000
68	Andector	Texas District 8	1946	151,853	37,387	301,000
69	West Delta, Block 30	Louisiana-South	1954	388,266	37,146	642,926
70	Caillou Island	Louisiana-South	1930	567,124	37,141	1,133,163
71	McKittrick	Cal.-San Joaquin	1887	230,569	37,131	994,170
72	McElroy	Texas District 8	1926	473,218	36,986	2,544,167
73	Cat Canyon E	Cal.-Coastal	1908	61,468	36,382	369,000
74	Lake Pasture	Texas District 2	1953	62,420	35,964	251,818
75	Empire	New Mexico	1924	186,522	34,628	390,202
76	Middle Ground Shoal	Alaska	1962	124,740	33,974	563,000
77	Brea-Olinda	Cal.-Los Angeles	1897	359,075	33,925	1,400,000
78	Fairway	Texas Districts 5 & 6	1960	159,487	33,505	414,216
79	So. Marsh Is., Block 128	Louisiana-South	1974	21,587	33,413	123,000
80	Ryckman Creek	Wyoming	1976	3,798	33,202	95,000
81	South Pass, Block 62	Louisiana-South	1965	77,074	33,170	208,533
82	Van	Texas District 5	1929	481,125	31,836	892,820
83	Cowden, South	Texas District 8	1932	155,913	31,164	763,250
84	Cogdell	Texas District 8	1949	234,193	30,987	523,818
85	Golden Trend	Oklahoma	1946	426,931	30,724	1,170,000
86	Yowlumne	Cal.-San Joaquin	1974	29,541	30,459	220,000
87	Cymric	Cal.-San Joaquin	1916	147,756	30,098	852,726
88	Santa Maria Valley	Cal.-Coastal	1934	175,216	29,784	1,127,000
89	West Delta, Block 79	Louisiana-South	1968	80,496	29,692	206,954
90	Giddings	Texas District 3	1960	11,382	29,258	505,333
91	Webster	Texas District 3	1937	517,482	29,104	740,699
92	Smackover	Arkansas	1922	525,555	29,089	1,512,127
93	West Ranch	Texas District 2	1934	332,799	28,588	693,527
94	Long Beach	Cal.-Los Angeles	1921	892,802	28,373	3,317,300
95	Prentice	Texas District 8A	1950	116,789	28,211	559,202
96	Good Hope	Louisiana-South	1944	64,710	28,111	151,260
97	Teapot Dome	Wyoming	1923	13,739	28,061	275,000
98	Baxterville	Mississippi	1944	193,641	27,844	680,500
99	E. Kansas Stripper	Kansas	1919	317,631	27,704	881,814
100	Main Pass Blk 306	Louisiana-South	1969	54,170	27,649	248,486
Total 100 Total				**40,989,290**	**19,458,393**	**171,289,373**
Top 100 Percentage of U.S.				**34.0%**	**71.9%**	**37.2%**
Total United States				**120,730,299**	**27,051,289**	**460,022,500**

Source: American Petroleum Institute, Reserves of Crude Oil, Natural Gas Liquids, and Natural Gas in the United States and Canada as of December 31, 1979, Volume 34, June 1980.

Appendix C

Conversion to the Metric System

Appendix C

Conversion to the Metric System

Public Law 100–418, the Omnibus Trade and Competitiveness Act of 1988, states: "It is the declared policy of the United States—

> (1) to designate the metric system of measurement as the preferred system of weights and measures for United States trade and commerce. . . .
>
> (2) to require that each Federal agency, by the end of Fiscal Year 1992, use the metric system of measurement in its procurements, grants, and other business–related activities."{44}

Table C1 is in keeping with the spirit of this law. The petroleum industry in the United States is slowly moving in the direction prescribed by this law and the data collected by EIA are collected in the units that are still common to the U.S. petroleum industry, namely barrels and cubic feet. Standard metric conversion factors were used to convert the National level volumes in **Table 1** to the metric equivalents in **Table C1**. Barrels were multiplied by 0.1589873 to convert to cubic meters and cubic feet were multiplied by 0.02831685 to convert to cubic meters.

Table C1. U.S. Proved Reserves of Crude Oil, Dry Natural Gas, and Natural Gas Liquids, in Metric Units, 1995 – 2005

Year	Adjustments (1)	Net Revisions (2)	Revisions[a] and Adjustments (3)	Net of Sales and Acquisitions (4)	Extensions (5)	New Field Discoveries (6)	New Reservoir Discoveries in Old Fields (7)	Total[b] Discoveries (8)	Estimated Production (9)	Proved[c] Reserves 12/31 (10)	Change from Prior Year (11)
					Crude Oil (million cubic meters)						
1995	19.4	163.4	182.8	NA	79.5	18.1	54.5	152.1	351.8	3,553.5	-16.9
1996	28.0	117.1	145.1	NA	86.3	38.6	22.4	147.3	345.5	3,500.4	-53.1
1997	82.6	145.4	228.0	NA	75.8	101.3	18.9	196.0	339.9	3,584.5	84.1
1998	-101.5	82.3	-19.2	NA	52.0	24.2	19.1	95.3	316.5	3,344.1	-240.4
1999	22.1	289.2	311.3	NA	41.2	51.0	23.1	115.3	310.3	3,460.4	116.3
2000	22.7	118.6	141.3	-3.2	121.8	43.9	39.6	205.3	298.9	3,504.9	44.5
2001	-0.6	-25.1	-25.8	-13.8	137.7	223.7	46.4	407.8	304.5	3,568.6	63.7
2002	66.1	114.5	180.6	3.8	78.2	47.7	24.5	150.4	298.1	3,605.4	36.8
2003	25.9	14.9	40.9	-63.3	67.7	112.1	16.1	195.9	298.4	3,480.4	-125.0
2004	11.8	66.8	78.5	3.7	98.1	5.2	21.0	124.3	289.2	3,397.7	-82.7
2005	35.1	90.5	125.6	44.2	128.0	32.6	6.5	167.1	275.5	3,459.1	61.4
					Dry Natural Gas (billion cubic meters)						
1995	16.42	219.00	235.42	NA	193.77	47.18	69.43	310.38	508.74	4,676.41	37.06
1996	107.18	115.70	222.88	NA	219.65	41.09	88.07	348.81	534.08	4,714.02	37.61
1997	-16.70	138.81	122.11	NA	299.73	75.92	67.45	443.10	544.00	4,735.23	21.21
1998	-46.30	162.54	116.24	NA	232.11	30.41	61.22	323.74	530.09	4,645.12	-90.11
1999	27.81	297.44	325.25	NA	199.44	44.40	62.18	306.02	535.98	4,740.41	95.29
2000	-25.23	197.14	171.91	114.15	418.72	56.15	67.05	541.93	544.22	5,024.17	283.76
2001	77.64	-65.64	12.01	74.47	463.83	101.32	79.29	644.44	560.08	5,195.01	170.84
2002	105.54	26.53	132.07	10.76	418.21	37.72	47.97	503.90	548.02	5,293.72	98.71
2003	80.45	-46.38	34.07	29.28	465.93	34.60	45.59	546.12	550.05	5,353.10	59.38
2004	-3.23	21.07	17.84	52.22	515.31	21.49	34.15	570.95	542.78	5,451.36	98.23
2005	53.43	76.43	129.86	72.04	596.07	26.67	34.21	656.95	522.67	5,787.54	336.18
					Natural Gas Liquids (million cubic meters)						
1995	30.6	44.0	74.6	NA	68.7	8.1	10.7	87.6	125.8	1,176.3	36.4
1996	75.4	27.8	103.2	NA	71.7	10.3	17.3	99.4	135.1	1,243.8	67.4
1997	-2.2	45.9	43.7	NA	85.1	18.1	14.3	117.5	137.4	1,267.6	23.8
1998	-57.4	33.1	-24.3	NA	60.9	10.5	14.0	85.4	132.4	1,196.2	-71.4
1999	15.8	115.6	131.4	NA	49.8	8.1	14.0	71.9	142.5	1,257.0	60.8
2000	-13.2	73.0	59.8	23.1	102.5	14.6	16.2	133.4	146.4	1,326.7	69.7
2001	-68.2	-21.0	-89.2	16.2	114.0	21.9	22.6	158.5	141.5	1,270.8	-55.9
2002	9.9	4.9	14.8	8.6	97.3	7.6	12.4	117.3	140.5	1,270.9	0.1
2003	-53.7	-25.6	-79.3	4.8	100.0	5.6	11.4	117.0	127.5	1,185.9	-85.0
2004	43.4	15.4	58.8	17.8	116.7	4.1	8.6	129.4	131.5	1,260.5	74.6
2005	-14.1	3.3	-10.8	24.8	137.2	5.1	6.7	149.0	125.3	1,298.1	37.7

[a]Revisions and adjustments = Col. 1 + Col. 2.

[b]Total discoveries = Col. 5 + Col. 6 + Col. 7.

[c]Proved reserves = Col. 10 from prior year + Col. 3 + Col. 4 + Col. 8 - Col. 9.

Notes: Old means discovered in a prior year. New means discovered during the report year. The production estimates in this table are based on data reported on Form EIA–23, "Annual Survey of Domestic Oil and Gas Reserves" and Form EIA–64A, "Annual Report of the Origin of Natural Gas Liquids Production." The following conversion factors were used to convert data: barrels = 0.1589873 per cubic meter and cubic feet = 0.02831685 per cubic meter. Number of decimal digits varies in order to accurately reproduce corresponding equivalents shown on Table 1 in Chapter 2.

Source: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*, 1995–2005 annual reports, DOE/EIA–0216.{19–28}

Appendix D

Historical Reserves Statistics

Appendix D

Historical Reserves Statistics

EIA maintains a data archive of all published proved reserves volumes at the State and National level. Appendix D provides a series of tables of the proved reserves and production of crude oil, natural gas, and natural gas liquids for the U.S. and the lower 48 States for the years 1977 through 2005.

All historical statistics included have previously been published in the annual reports of 1977 through 2004 of the EIA publication *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves Annual Report*, DOE EIA-0216.{1-28}

Liquid volumes are in million barrels of 42 U.S. gallons. Gas volumes are in billion cubic feet (Bcf), at 14.73 psia and 60° Fahrenheit. NA appears in this appendix wherever data are not available or are withheld to avoid disclosure of data which may be proprietary. An asterisk (*) marks those estimates associated with sampling errors (95 percent confidence interval) greater than 20 percent of the value estimated.

An electronic version of the Data Archive (in Microsoft Excel™) format is available for downloading at the following link:
http://www.eia.doe.gov/oil_gas/natural_gas/data_publications/crude_oil_natural_gas_reserves/cr.html

The Data Archive is listed in the "Special Files" section of the destination site.

Table D1. U.S. Proved Reserves of Crude Oil, 1976–2005
(Million Barrels of 42 U.S. Gallons)

Year	Adjustments[a] (1)	Net Revisions (2)	Revisions[b] and Adjustments (3)	Net of Sales and Acquisitions (4)	Extensions (5)	New Field Discoveries (6)	New Reservoir Discoveries in Old Fields (7)	Total[c] Discoveries (8)	Estimated Production (9)	Proved[d] Reserves 12/31 (10)	Change from Prior Year (11)
1976	–	–	–	–	–	–	–	–	–	[e]33,502	–
1977	[f]-40	386	346	NA	496	168	130	794	2,862	31,780	-1,722
1978	366	1,390	1,756	NA	444	267	116	827	3,008	31,355	-425
1979	337	437	774	NA	424	108	104	636	2,955	29,810	-1,545
1980	219	1,889	2,108	NA	572	143	147	862	2,975	29,805	-5
1981	138	1,271	1,409	NA	750	254	157	1,161	2,949	29,426	-379
1982	-83	434	351	NA	634	204	193	1,031	2,950	27,858	-1,568
1983	462	1,511	1,973	NA	629	105	190	924	3,020	27,735	-123
1984	159	2,445	2,604	NA	744	242	158	1,144	3,037	28,446	711
1985	429	1,598	2,027	NA	742	84	169	995	3,052	28,416	-30
1986	57	855	912	NA	405	48	81	534	2,973	26,889	-1,527
1987	233	2,316	2,549	NA	484	96	111	691	2,873	27,256	367
1988	364	1,463	1,827	NA	355	71	127	553	2,811	26,825	-431
1989	213	1,333	1,546	NA	514	112	90	716	2,586	26,501	-324
1990	86	1,483	1,569	NA	456	98	135	689	2,505	26,254	-247
1991	163	223	386	NA	365	97	92	554	2,512	24,682	-1,572
1992	290	735	1,025	NA	391	8	85	484	2,446	23,745	-937
1993	271	495	766	NA	356	319	110	785	2,339	22,957	-788
1994	189	1,007	1,196	NA	397	64	111	572	2,268	22,457	-500
1995	122	1,028	1,150	NA	500	114	343	957	2,213	22,351	-106
1996	175	737	912	NA	543	243	141	927	2,173	22,017	-334
1997	520	914	1,434	NA	477	637	119	1,233	2,138	22,546	529
1998	-638	518	-120	NA	327	152	120	599	1,991	21,034	-1,512
1999	139	1,819	1,958	NA	259	321	145	725	1,952	21,765	731
2000	143	746	889	-20	766	276	249	1,291	1,880	22,045	280
2001	-4	-158	-162	-87	866	1,407	292	2,565	1,915	22,446	401
2002	416	720	1,136	24	492	300	154	946	1,875	22,677	231
2003	163	94	257	-398	426	705	101	1,232	1,877	21,891	-786
2004	74	420	494	23	617	33	132	782	1,819	21,371	-520
2005	221	569	790	278	805	205	41	1,051	1,733	21,757	386

[a]Includes operator reported corrections for the years 1978 through 1981. After 1981 operators included corrections with revisions.
[b]Revisions and adjustments = Col. 1 + Col. 2.
[c]Total discoveries = Col. 5 + Col. 6 + Col. 7.
[d]Proved reserves = Col. 10 from prior year + Col. 3 + Col. 4 + Col. 8 - Col. 9.
[e]Based on following year data only.
[f]Consists only of operator reported corrections and no other adjustments.
– = Not applicable.

Notes: Old means discovered in a prior year. New means discovered during the report year. The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves". They may differ from the official Energy Information Administration production data for crude oil contained in the *Petroleum Supply Annual*, DOE/EIA-0340.

Source: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*, 1977 through 2005 annual reports, DOE/EIA-0216.{1-28}

Table D2. U.S. Lower 48 Proved Reserves of Crude Oil, 1976–2005
(Million Barrels of 42 U.S. Gallons)

Year	Adjustments[a] (1)	Net Revisions (2)	Revisions[b] and Adjustments (3)	Net of Sales and Acquisitions (4)	Extensions (5)	New Field Discoveries (6)	New Reservoir Discoveries in Old Fields (7)	Total[c] Discoveries (8)	Estimated Production (9)	Proved[d] Reserves 12/31 (10)	Change from Prior Year (11)
1976	–	–	–	–	–	–	–	–	–	[e]24,928	–
1977	[f]–40	383	343	NA	496	168	130	794	2,698	23,367	-1,561
1978	-48	509	461	NA	444	142	116	702	2,559	21,971	-1,396
1979	342	429	771	NA	424	108	104	636	2,443	20,935	-1,036
1980	210	1,524	1,734	NA	479	143	147	769	2,384	21,054	119
1981	276	1,009	1,285	NA	750	254	157	1,161	2,357	21,143	89
1982	-82	684	602	NA	633	204	193	1,030	2,323	20,452	-691
1983	462	949	1,411	NA	625	105	190	920	2,355	20,428	-24
1984	160	1,587	1,747	NA	742	207	158	1,107	2,399	20,883	455
1985	361	1,667	2,028	NA	581	84	169	834	2,385	21,360	477
1986	70	359	429	NA	399	48	81	528	2,303	20,014	-1,346
1987	233	1,353	1,586	NA	294	38	101	433	2,155	19,878	-136
1988	359	1,181	1,540	NA	340	43	127	510	2,062	19,866	-12
1989	214	1,113	1,327	NA	342	108	87	537	1,903	19,827	-39
1990	151	1,001	1,152	NA	371	98	135	604	1,853	19,730	-97
1991	164	50	214	NA	327	97	87	511	1,856	18,599	-1,131
1992	297	277	574	NA	279	8	84	371	1,821	17,723	-876
1993	250	198	448	NA	343	319	109	771	1,760	17,182	-541
1994	187	527	714	NA	316	64	111	491	1,697	16,690	-492
1995	117	756	873	NA	434	114	333	881	1,673	16,771	81
1996	172	728	900	NA	479	115	141	735	1,663	16,743	-28
1997	514	695	1,209	NA	459	520	119	1,098	1,665	17,385	642
1998	-639	315	-324	NA	299	56	120	475	1,554	15,982	-1,403
1999	138	1,669	1,807	NA	253	242	145	640	1,564	16,865	883
2000	144	622	766	132	540	276	157	973	1,552	17,184	319
2001	-5	-71	-76	-87	716	1,126	292	2,134	1,560	17,595	411
2002	414	567	981	24	467	300	146	913	1,514	17,999	404
2003	162	5	167	-398	391	705	101	1,197	1,520	17,445	-554
2004	75	373	448	23	506	33	74	613	1,485	17,044	-401
2005	223	467	690	278	749	205	41	995	1,421	17,586	542

[a]Includes operator reported corrections for the years 1978 through 1981. After 1981 operators included corrections with revisions.
[b]Revisions and adjustments = Col. 1 + Col. 2.
[c]Total discoveries = Col. 5 + Col. 6 + Col. 7.
[d]Proved reserves = Col. 10 from prior year + Col. 3 + Col. 4 + Col. 8 - Col. 9.
[e]Based on following year data only.
[f]Consists only of operator reported corrections and no other adjustments.
– = Not applicable.

Notes: Old means discovered in a prior year. New means discovered during the report year. The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves". They may differ from the official Energy Information Administration production data for crude oil contained in the *Petroleum Supply Annual*, DOE/EIA-0340.

Source: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves,* 1977 through 2005 annual reports, DOE/EIA-0216.{1-28}

Table D3. U.S. Proved Reserves of Dry Natural Gas, 1976–2005
(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

Year	Adjustments[a] (1)	Net Revisions (2)	Revisions[b] and Adjustments (3)	Net of Sales and Acquisitions (4)	Extensions (5)	New Field Discoveries (6)	New Reservoir Discoveries in Old Fields (7)	Total[c] Discoveries (8)	Estimated Production (9)	Proved[d] Reserves 12/31 (10)	Change from Prior Year (11)
1976	–	–	–	–	–	–	–	–	–	[e]213,278	–
1977	[f]–20	-1,605	-1,625	NA	8,129	3,173	3,301	14,603	18,843	207,413	-5,865
1978	2,429	-1,025	1,404	NA	9,582	3,860	4,579	18,021	18,805	208,033	620
1979	-2,264	-219	-2,483	NA	8,950	3,188	2,566	14,704	19,257	200,997	-7,036
1980	1,201	1,049	2,250	NA	9,357	2,539	2,577	14,473	18,699	199,021	-1,976
1981	1,627	2,599	4,226	NA	10,491	3,731	2,998	17,220	18,737	201,730	2,709
1982	2,378	455	2,833	NA	8,349	2,687	3,419	14,455	17,506	201,512	-218
1983	3,090	-15	3,075	NA	6,909	1,574	2,965	11,448	15,788	200,247	-1,265
1984	-2,241	3,129	888	NA	8,299	2,536	2,686	13,521	17,193	197,463	-2,784
1985	-1,708	2,471	763	NA	7,169	999	2,960	11,128	15,985	193,369	-4,094
1986	1,320	3,572	4,892	NA	6,065	1,099	1,771	8,935	15,610	191,586	-1,783
1987	1,268	3,296	4,564	NA	4,587	1,089	1,499	7,175	16,114	187,211	-4,375
1988	2,193	-15,060	-12,867	NA	6,803	1,638	1,909	10,350	16,670	168,024	-19,187
1989	3,013	3,030	6,043	NA	6,339	1,450	2,243	10,032	16,983	167,116	-908
1990	1,557	5,538	7,095	NA	7,952	2,004	2,412	12,368	17,233	169,346	2,230
1991	2,960	4,416	7,376	NA	5,090	848	1,604	7,542	17,202	167,062	-2,284
1992	2,235	6,093	8,328	NA	4,675	649	1,724	7,048	17,423	165,015	-2,047
1993	972	5,349	6,321	NA	6,103	899	1,866	8,868	17,789	162,415	-2,600
1994	1,945	5,484	7,429	NA	6,941	1,894	3,480	12,315	18,322	163,837	1,422
1995	580	7,734	8,314	NA	6,843	1,666	2,452	10,961	17,966	165,146	1,309
1996	3,785	4,086	7,871	NA	7,757	1,451	3,110	12,318	18,861	166,474	1,328
1997	-590	4,902	4,312	NA	10,585	2,681	2,382	15,648	19,211	167,223	749
1998	-1,635	5,740	4,105	NA	8,197	1,074	2,162	11,433	18,720	164,041	-3,182
1999	982	10,504	11,486	NA	7,043	1,568	2,196	10,807	18,928	167,406	3,365
2000	-891	6,962	6,071	4,031	14,787	1,983	2,368	19,138	19,219	177,427	10,021
2001	2,742	-2,318	424	2,630	16,380	3,578	2,800	22,758	19,779	183,460	6,033
2002	3,727	937	4,664	380	14,769	1,332	1,694	17,795	19,353	186,946	3,486
2003	2,841	-1,638	1,203	-10,092	16,454	1,222	1,610	19,286	19,425	189,044	2,098
2004	-114	744	630	1,844	18,198	759	1,206	20,163	19,168	192,513	3,469
2005	1,887	2,699	4,856	2,544	21,050	942	1,208	23,200	18,458	204,385	11,872

[a]Includes operator reported corrections for the years 1978 through 1981. After 1981 operators included corrections with revisions.
[b]Revisions and adjustments = Col. 1 + Col. 2.
[c]Total discoveries = Col. 5 + Col. 6 + Col. 7.
[d]Proved reserves = Col. 10 from prior year + Col. 3 + Col. 4 + Col. 8 - Col. 9.
[e]Based on following year data only.
[f]Consists only of operator reported corrections and no other adjustments.
[g]An unusually large revision decrease to North Slope dry natural gas reserves was made in 1988. It recognizes some 24.6 trillion cubic feet of downward revisions reported during the last few years by operators because of economic and market conditions. EIA in previous years carried these reserves in the proved category.

– = Not applicable.

Notes: Old means discovered in a prior year. New means discovered during the report year. The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," and Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production". They may differ from the official Energy Information Administration production data for natural gas contained in the *Natural Gas Annual,* DOE/EIA-0131.

Source: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves,* 1977 through 2005 annual reports, DOE/EIA-0216.{1-28}

Table D4. U.S. Lower 48 Proved Reserves of Dry Natural Gas, 1976–2005
(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

Year	Adjustments[a] (1)	Net Revisions (2)	Revisions[b] and Adjustments (3)	Net of Sales and Acquisitions (4)	Extensions (5)	New Field Discoveries (6)	New Reservoir Discoveries in Old Fields (7)	Total[c] Discoveries (8)	Estimated Production (9)	Proved[d] Reserves 12/31 (10)	Change from Prior Year (11)
1976	–	–	–	–	–	–	–	–	–	[e]180,838	–
1977	[f]–21	-1,540	-1,561	NA	8,056	3,173	3,301	14,530	18,637	175,170	-5,668
1978	2,446	-758	1,688	NA	9,582	3,860	4,277	17,719	18,589	175,988	818
1979	-2,202	-707	-2,909	NA	8,949	3,173	2,566	14,688	19,029	168,738	-7,250
1980	1,163	62	1,225	NA	9,046	2,539	2,577	14,162	18,486	165,639	-3,099
1981	1,840	2,506	4,346	NA	10,485	3,731	2,994	17,210	18,502	168,693	3,054
1982	2,367	-1,748	619	NA	8,349	2,687	3,419	14,455	17,245	166,522	-2,171
1983	3,089	421	3,510	NA	6,908	1,574	2,965	11,447	15,515	165,964	-558
1984	-2,245	2,617	372	NA	8,298	2,536	2,686	13,520	16,869	162,987	-2,977
1985	-1,349	2,500	1,151	NA	7,098	999	2,960	11,057	15,673	159,522	-3,465
1986	1,618	4,144	5,762	NA	6,064	1,099	1,761	8,924	15,286	158,922	-600
1987	1,066	2,645	3,711	NA	4,542	1,077	1,499	7,118	15,765	153,986	-4,936
1988	2,017	8,895	10,912	NA	6,771	1,638	1,909	10,318	16,270	158,946	4,960
1989	2,997	2,939	5,936	NA	6,184	1,450	2,243	9,877	16,582	158,177	-769
1990	1,877	4,572	6,449	NA	7,898	2,004	2,412	12,314	16,894	160,046	1,869
1991	2,967	3,860	6,827	NA	5,074	848	1,563	7,485	16,849	157,509	-2,537
1992	1,946	5,937	7,883	NA	4,621	649	1,724	6,994	17,009	155,377	-2,132
1993	915	4,779	5,694	NA	6,076	899	1,858	8,833	17,396	152,508	-2,869
1994	1,896	5,289	7,185	NA	6,936	1,894	3,480	12,310	17,899	154,104	1,596
1995	973	7,223	8,196	NA	6,801	1,666	2,452	10,919	17,570	155,649	1,545
1996	3,640	4,055	7,695	NA	7,751	1,390	3,110	12,251	18,415	157,180	1,531
1997	-609	3,192	2,583	NA	10,571	2,681	2,382	15,634	18,736	156,661	-519
1998	-1,463	5,696	4,233	NA	8,195	1,070	2,162	11,427	18,207	154,114	-2,547
1999	849	10,452	11,301	NA	7,041	1,512	2,173	10,726	18,469	157,672	3,558
2000	-914	8,755	7,841	4,214	12,838	1,983	2,355	17,176	18,713	168,190	10,518
2001	2,753	-2,216	537	2,630	16,321	3,504	2,796	21,621	19,318	174,660	6,470
2002	3,692	914	4,606	380	14,707	1,332	1,686	17,725	18,893	178,478	3,818
2003	2,840	-1,830	1,010	1,034	16,373	1,202	1,609	19,184	18,947	180,759	2,281
2004	-113	319	206	1,844	18,057	759	1,171	19,987	18,690	184,106	3,347
2005	1,889	2,560	4,449	2,542	20,988	920	1,198	23,106	17,989	196,214	12,108

[a]Includes operator reported corrections for the years 1978 through 1981. After 1981 operators included corrections with revisions.
[b]Revisions and adjustments = Col. 1 + Col. 2.
[c]Total discoveries = Col. 5 + Col. 6 + Col. 7.
[d]Proved reserves = Col. 10 from prior year + Col. 3 + Col. 4 + Col. 8 - Col. 9.
[e]Based on following year data only.
[f]Consists only of operator reported corrections and no other adjustments.
– = Not applicable.

Notes: Old means discovered in a prior year. New means discovered during the report year. The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," and Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production". They may differ from the official Energy Information Administration production data for natural gas contained in the *Natural Gas Annual,* DOE/EIA-0131.

Source: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves,* 1977 through 2005 annual reports, DOE/EIA-0216.{1-28}

Table D5. U.S. Proved Reserves of Wet Natural Gas, After Lease Separation, 1978–2005
(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

Year	Adjustments[a] (1)	Net Revisions (2)	Revisions[b] and Adjustments (3)	Net of Sales and Acquisitions (4)	Extensions (5)	New Field Discoveries (6)	New Reservoir Discoveries in Old Fields (7)	Total[c] Discoveries (8)	Estimated Production (9)	Proved[d] Reserves 12/31 (10)	Change from Prior Year (11)
1978	–	–	–	–	–	–	–	–	–	[e]208,033	–
1979	5,356	-223	5,133	NA	9,332	3,279	2,637	15,248	20,079	208,335	302
1980	1,253	1,137	2,390	NA	9,757	2,629	2,648	15,034	19,500	206,259	-2,076
1981	2,057	2,743	4,800	NA	10,979	3,870	3,080	17,929	19,554	209,434	3,175
1982	2,598	455	3,053	NA	8,754	2,785	3,520	15,059	18,292	209,254	-180
1983	4,363	57	4,420	NA	7,263	1,628	3,071	11,962	16,590	209,046	-208
1984	-2,413	3,333	920	NA	8,688	2,584	2,778	14,050	18,032	205,984	-3,062
1985	-1,299	2,687	1,388	NA	7,535	1,040	3,053	11,628	16,798	202,202	-3,782
1986	2,137	3,835	5,972	NA	6,359	1,122	1,855	9,336	16,401	201,109	-1,093
1987	1,199	3,522	4,721	NA	4,818	1,128	1,556	7,502	16,904	196,428	-4,681
1988	2,180	-14,931	[f]-12,751	NA	7,132	1,677	1,979	10,788	17,466	[f]176,999	–19,429
1989	2,537	3,220	5,757	NA	6,623	1,488	2,313	10,424	17,752	175,428	-1,571
1990	1,494	5,837	7,331	NA	8,287	2,041	2,492	12,820	18,003	177,576	2,148
1991	3,368	4,569	7,937	NA	5,298	871	1,655	7,824	18,012	175,325	-2,251
1992	2,543	6,374	8,917	NA	4,895	668	1,773	7,336	18,269	173,309	-2,016
1993	1,048	5,541	6,589	NA	6,376	927	1,930	9,233	18,641	170,490	-2,819
1994	1,977	5,836	7,813	NA	7,299	1,941	3,606	12,846	19,210	171,939	1,449
1995	889	8,091	8,980	NA	7,204	1,709	2,518	11,431	18,874	173,476	1,537
1996	4,288	4,277	8,565	NA	8,189	1,491	3,209	12,889	19,783	175,147	1,671
1997	-730	5,057	4,327	NA	11,179	2,747	2,455	16,381	20,134	175,721	574
1998	-1,624	5,982	4,358	NA	8,630	1,116	2,240	11,986	19,622	172,433	-3,288
1999	1,102	11,182	12,284	NA	7,401	1,622	2,265	11,288	19,856	176,159	3,726
2000	-1,295	7,456	6,161	4,286	15,550	2,055	2,463	20,068	20,164	186,510	10,351
2001	1,849	-2,438	-589	2,715	17,183	3,668	2,898	23,749	20,642	191,743	5,233
2002	4,004	1,038	5,042	428	15,468	1,374	1,752	18,594	20,248	195,561	3,816
2003	2,323	-1,715	608	1,107	17,195	1,252	1,653	20,100	20,231	197,145	1,584
2004	170	825	995	1,975	19,068	790	1,244	21,102	20,017	201,200	4,055
2005	1,693	2,715	4,408	2,674	22,069	973	1,243	24,285	19,259	213,308	12,108

[a]Includes operator reported corrections for the years 1978 through 1981. After 1981 operators included corrections with revisions.
[b]Revisions and adjustments = Col. 1 + Col. 2.
[c]Total discoveries = Col. 5 + Col. 6 + Col. 7.
[d]Proved reserves = Col. 10 from prior year + Col. 3 + Col. 4 + Col. 8 - Col. 9.
[e]Based on following year data only.
[f]An unusually large revision decrease to North Slope wet natural gas reserves was made in 1988. It recognizes some 25 trillion cubic feet of downward revisions reported during the last few years by operators because of economic and market conditions. EIA in previous years carried these reserves in the proved category.

– = Not applicable.

Notes: Old means discovered in a prior year. New means discovered during the report year. The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves". They may differ from the official Energy Information Administration production data for natural gas contained in the *Natural Gas Annual,* DOE/EIA-013.

Source: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves,* 1979 through 2005 annual reports, DOE/EIA-0216.{3-28}

Table D6. U.S. Lower 48 Proved Reserves of Wet Natural Gas, After Lease Separation, 1978–2005
(Billion Cubic Feet at 14.73 psia and 60° Fahrenheit)

Year	Adjustments[a] (1)	Net Revisions (2)	Revisions[b] and Adjustments (3)	Net of Sales and Acquisitions (4)	Extensions (5)	New Field Discoveries (6)	New Reservoir Discoveries in Old Fields (7)	Total[c] Discoveries (8)	Estimated Production (9)	Proved[d] Reserves 12/31 (10)	Change from Prior Year (11)
1978	–	–	–	–	–	–	–	–	–	[e]175,988	–
1979	5,402	-711	4,691	NA	9,331	3,264	2,637	15,232	19,851	176,060	72
1980	1,218	150	1,368	NA	9,446	2,629	2,648	14,723	19,287	172,864	-3,196
1981	2,270	2,650	4,920	NA	10,973	3,870	3,076	17,919	19,318	176,385	3,521
1982	2,586	-1,748	838	NA	8,754	2,785	3,520	15,059	18,030	174,252	-2,133
1983	4,366	493	4,859	NA	7,262	1,628	3,071	11,961	16,317	174,755	503
1984	-2,409	2,821	412	NA	8,687	2,584	2,778	14,049	17,708	171,508	-3,247
1985	-1,313	2,713	1,400	NA	7,463	1,040	3,053	11,556	16,485	167,979	-3,529
1986	2,114	4,410	6,524	NA	6,357	1,122	1,845	9,324	16,073	167,754	-225
1987	1,200	2,868	4,068	NA	4,772	1,116	1,556	7,444	16,553	162,713	-5,041
1988	2,025	9,390	11,415	NA	7,099	1,677	1,979	10,755	17,063	167,820	5,107
1989	2,545	3,128	5,673	NA	6,467	1,485	2,313	10,265	17,349	166,409	-1,411
1990	1,811	4,859	6,670	NA	8,232	2,041	2,492	12,765	17,661	168,183	1,774
1991	3,367	4,013	7,380	NA	5,281	871	1,614	7,766	17,657	165,672	-2,511
1992	2,265	6,217	8,482	NA	4,840	668	1,773	7,281	17,851	163,584	-2,088
1993	996	4,971	5,967	NA	6,349	927	1,922	9,198	18,245	160,504	-3,080
1994	1,924	5,613	7,537	NA	7,294	1,941	3,606	12,841	18,756	162,126	1,622
1995	1,304	7,525	8,829	NA	7,162	1,709	2,518	11,389	18,443	163,901	1,775
1996	4,219	4,246	8,465	NA	8,183	1,430	3,209	12,822	19,337	165,851	1,950
1997	-835	3,322	2,487	NA	11,165	2,747	2,455	16,367	19,657	165,048	-803
1998	-1,461	5,937	4,476	NA	8,628	1,112	2,240	11,980	19,104	162,400	-2,648
1999	958	11,130	12,088	NA	7,399	1,566	2,242	11,207	19,391	166,304	3,904
2000	-1,294	9,273	7,979	4,471	13,574	2,055	2,450	18,079	19,654	177,179	10,875
2001	1,849	-2,336	-487	2,715	17,123	3,593	2,894	23,610	20,175	182,842	5,663
2002	4,004	1,038	5,042	428	15,468	1,374	1,752	18,594	20,248	19,5561	3,816
2003	2,324	-1,909	415	1,107	17,114	1,232	1,652	19,998	19,751	188,797	1,769
2004	170	395	565	1,975	18,927	790	1,209	20,926	19,536	192,727	3,930
2005	1,694	2,575	4,269	2,672	22,007	951	1,233	24,191	18,788	205,071	12,344

[a]Includes operator reported corrections for the years 1978 through 1981. After 1981 operators included corrections with revisions.
[b]Revisions and adjustments = Col. 1 + Col. 2.
[c]Total discoveries = Col. 5 + Col. 6 + Col. 7.
[d]Proved reserves = Col. 10 from prior year + Col. 3 + Col. 4 + Col. 8 - Col. 9.
[e]Based on following year data only.
– = Not applicable.

Notes: Old means discovered in a prior year. New means discovered during the report year. The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves". They may differ from the official Energy Information Administration production data for natural gas contained in the *Natural Gas Annual,* DOE/EIA-0131.

Source: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves,* 1979 through 2005 annual reports, DOE/EIA-0216.{3-28}

Table D7. U.S. Proved Reserves of Natural Gas Liquids, 1978–2005
(Million Barrels of 42 U.S. Gallons)

Year	Adjustments[a] (1)	Net Revisions (2)	Revisions[b] and Adjustments (3)	Net of Sales and Acquisitions (4)	Extensions (5)	New Field Discoveries (6)	New Reservoir Discoveries in Old Fields (7)	Total[c] Discoveries (8)	Estimated Production (9)	Proved[d] Reserves 12/31 (10)	Change from Prior Year (11)
1978	–	–	–	–	–	–	–	–	–	[e]6,772	–
1979	[f]64	-49	15	NA	364	94	97	555	727	6,615	-157
1980	153	104	257	NA	418	90	79	587	731	6,728	113
1981	231	86	317	NA	542	131	91	764	741	7,068	340
1982	299	-21	278	NA	375	112	109	596	721	7,221	153
1983	849	66	915	NA	321	70	99	490	725	7,901	680
1984	-123	142	19	NA	348	55	96	499	776	7,643	-258
1985	426	162	588	NA	337	44	85	466	753	7,944	301
1986	367	223	590	NA	263	34	72	369	738	8,165	221
1987	231	191	422	NA	213	39	55	307	747	8,147	-18
1988	11	453	464	NA	268	41	72	381	754	8,238	91
1989	-277	123	-154	NA	259	83	74	416	731	7,769	-469
1990	-83	221	138	NA	299	39	73	411	732	7,586	-183
1991	233	130	363	NA	189	25	55	269	754	7,464	-122
1992	225	261	486	NA	190	20	64	274	773	7,451	-13
1993	102	124	226	NA	245	24	64	333	788	7,222	-229
1994	43	197	240	NA	314	54	131	499	791	7,170	-52
1995	192	277	469	NA	432	52	67	551	791	7,399	229
1996	474	175	649	NA	451	65	109	625	850	7,823	424
1997	-14	289	275	NA	535	114	90	739	864	7,973	150
1998	-361	208	-153	NA	383	66	88	537	833	7,524	-449
1999	99	727	826	NA	313	51	88	452	896	7,906	382
2000	-83	459	376	145	645	92	102	839	921	8,345	439
2001	-429	-132	-561	102	717	138	142	997	890	7,993	-352
2002	62	31	93	54	612	48	78	738	884	7,994	1
2003	-338	-161	-499	30	629	35	72	736	802	7,459	-535
2004	273	97	370	112	734	26	54	814	827	7,928	469
2005	-89	21	-68	156	863	32	42	937	788	8,165	237

[a]Includes operator reported corrections for the years 1978 through 1981. After 1981 operators included corrections with revisions.
[b]Revisions and adjustments = Col. 1 + Col. 2.
[c]Total discoveries = Col. 5 + Col. 6 + Col. 7.
[d]Proved reserves = Col. 10 from prior year + Col. 3 + Col. 4 + Col. 8 - Col. 9.
[e]Based on following year data only.
[f]Consists only of operator reported corrections and no other adjustments.
– = Not applicable.

Notes: Old means discovered in a prior year. New means discovered during the report year. The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," and Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production". They may differ from the official Energy Information Administration production data for natural gas liquids contained in the *Natural Gas Annual,* DOE/EIA-0131.

Source: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves,* 1979 through 2005 annual reports, DOE/EIA-0216.{3-28}

Table D8. U.S. Lower 48 Proved Reserves of Natural Gas Liquids, 1978–2005
(Million Barrels of 42 U.S. Gallons)

Year	Adjustments[a] (1)	Net Revisions (2)	Revisions[b] and Adjustments (3)	Net of Sales and Acquisitions (4)	Extensions (5)	New Field Discoveries (6)	New Reservoir Discoveries in Old Fields (7)	Total[c] Discoveries (8)	Estimated Production (9)	Proved[d] Reserves 12/31 (10)	Change from Prior Year (11)
1978	–	–	–	–	–	–	–	–	–	[e]6,749	–
1979	[f]63	-49	14	NA	364	94	97	555	726	6,592	-157
1980	165	104	269	NA	418	90	79	587	731	6,717	125
1981	233	85	318	NA	542	131	91	764	741	7,058	341
1982	300	-21	279	NA	375	112	109	596	721	7,212	154
1983	850	66	916	NA	321	70	99	490	725	7,893	681
1984	-115	123	8	NA	348	55	96	499	776	7,624	-269
1985	70	152	222	NA	334	44	85	463	748	7,561	-63
1986	363	226	589	NA	263	34	72	369	735	7,784	223
1987	179	191	370	NA	212	39	55	306	731	7,729	-55
1988	10	452	462	NA	267	41	72	380	734	7,837	108
1989	-273	123	-150	NA	259	83	74	416	714	7,389	-448
1990	-60	221	161	NA	298	39	73	410	714	7,246	-143
1991	183	138	321	NA	187	25	55	267	730	7,104	-142
1992	225	254	479	NA	183	20	64	267	746	7,104	0
1993	101	124	225	NA	245	24	64	333	761	6,901	-203
1994	38	196	234	NA	314	54	131	499	765	6,869	-32
1995	204	230	434	NA	432	52	67	551	761	7,093	224
1996	417	178	595	NA	450	56	109	615	817	7,486	393
1997	-107	55	-52	NA	533	114	90	737	829	7,342	-144
1998	-74	208	134	NA	383	66	88	537	809	7,204	-138
1999	102	617	719	NA	304	50	86	440	848	7,515	311
2000	9	459	468	145	645	92	102	839	899	8,068	553
2001	-429	-280	-709	-102	717	138	142	997	870	7,588	-480
2002	42	31	73	54	612	48	78	738	864	7,589	1
2003	-338	-161	-499	30	629	35	72	736	784	7,072	-517
2004	273	97	370	112	734	26	54	814	809	7,559	487
2005	-89	21	-68	156	863	32	42	937	771	7,813	254

[a]Includes operator reported corrections for the years 1978 through 1981. After 1981 operators included corrections with revisions.
[b]Revisions and adjustments = Col. 1 + Col. 2.
[c]Total discoveries = Col. 5 + Col. 6 + Col. 7.
[d]Proved reserves = Col. 10 from prior year + Col. 3 + Col. 4 + Col. 8 - Col. 9.
[e]Based on following year data only.
[f]Consists only of operator reported corrections and no other adjustments.
– = Not applicable.

Notes: Old means discovered in a prior year. New means discovered during the report year. The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," and Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production". They may differ from the official Energy Information Administration production data for natural gas liquids contained in the *Natural Gas Annual,* DOE/EIA-0131.

Source: *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*, 1979 through 2005 annual reports, DOE/EIA-0216.{3-28}

Table D9. Deepwater Production and Proved Reserves of the Gulf of Mexico Federal Offshore, 1992-2005

Year	Gulf of Mexico			Depth		Deepwater Percentage
	Total	Louisiana[a]	Texas	Greater than 200 meters	Less than 200 meters	
	Crude Oil (million barrels of 42 U.S. gallons)					
Production						
1992	267	253	14	46	221	17.2
1993	266	252	14	46	220	17.3
1994	265	245	20	53	212	20.1
1995	292	262	30	77	215	26.4
1996	303	265	38	90	213	29.7
1997	342	298	44	123	219	36.0
1998	372	336	36	171	201	46.0
1999	421	376	45	228	193	54.2
2000	419	381	38	234	185	55.8
2001	459	417	42	286	173	62.2
2002	451	395	57	288	163	63.9
2003	485	426	59	336	149	69.3
2004	467	404	63	310	157	66.4
2005	409	342	67	305	104	75.0
Reserves						
1992	1,835	1,643	192	557	1,278	30.4
1993	2,072	1,880	192	824	1,248	39.8
1994	2,127	1,922	205	877	1,250	41.2
1995	2,518	2,269	249	1,241	1,277	49.3
1996	2,567	2,357	210	1,311	1,256	51.1
1997	2,949	2,587	362	1,682	1,267	57.0
1998	2,793	2,483	310	1,611	1,182	57.8
1999	2,744	2,442	302	1,626	1,118	59.3
2000	3,174	2,751	423	2,021	1,153	63.7
2001	4,288	3,877	411	3,208	1,080	74.8
2002	4,444	4,088	356	3,372	1,072	75.9
2003	4,554	4,251	303	3,627	927	79.6
2004	4,144	3,919	225	3,280	864	79.2
2005	4,042	3,851	191	3,272	770	81.0

Table D9. Deepwater Production and Proved Reserves of the Gulf of Mexico Federal Offshore, 1992-2005 (continued)

Year	Gulf of Mexico			Depth		Deepwater Percentage
	Total	Louisiana[a]	Texas	Greater than 200 meters	Less than 200 meters	
	Natural Gas, Wet After Lease Separation (billion cubic feet at 14.73 psia and 60° Fahrenheit)					
Production						
1992	4,576	3,292	1,284	166	4,410	3.6
1993	4,651	3,383	1,268	229	4,422	4.9
1994	4,797	3,505	1,292	294	4,503	6.1
1995	4,679	3,421	1,258	354	4,315	7.8
1996	5,045	3,752	1,293	549	4,496	10.9
1997	5,230	3,984	1,246	577	4,653	11.0
1998	4,967	3,817	1,150	724	4,243	14.6
1999	5,000	3,829	1,171	1,124	3,876	22.5
2000	4,901	3,747	1,154	1,196	3,705	24.4
2001	5,027	3,843	1,184	1,367	3,660	27.2
2002	4,544	3,541	1,003	1,365	3,180	30.0
2003	4,397	3,330	1,067	1,545	2,852	35.1
2004	3,967	2,890	1,077	1,251	2,716	31.5
2005	2,968	2,056	912	1,070	1,898	36.1
Reserves						
1992	27,050	20,006	7,044	3,273	23,777	12.1
1993	26,463	19,751	6,712	3,495	22,968	13.2
1994	27,626	21,208	6,418	4,772	22,854	17.3
1995	28,229	21,664	6,565	5,811	22,418	20.6
1996	28,153	22,119	6,034	6,389	21,764	22.7
1997	28,455	22,428	6,027	7,491	20,964	26.3
1998	26,937	21,261	5,676	7,575	19,362	28.1
1999	26,062	20,172	5,890	7,726	18,336	29.6
2000	26,891	20,466	6,425	8,731	18,160	32.5
2001	27,100	20,290	6,810	11,229	15,871	41.4
2002	25,347	19,113	6,234	10,540	14,807	41.6
2003	22,522	17,168	5,354	10,041	12,481	44.6
2004	19,288	15,144	4,144	8,591	10,698	44.5
2005	17,427	14,073	3,354	8,042	9,385	46.1

Table D9. Deepwater Production and Proved Reserves of the Gulf of Mexico Federal Offshore, 1992-2005 (continued)

Year	Gulf of Mexico			Depth		Deepwater Percentage
	Total	Louisiana[a]	Texas	Greater than 200 meters	Less than 200 meters	
	Natural Gas Liquids (million barrels of 42 U.S. gallons)					
Production						
1992	91	76	15	4	87	4.4
1993	97	80	17	6	91	6.2
1994	98	83	15	6	92	6.1
1995	85	71	14	12	73	14.1
1996	101	84	17	13	88	12.9
1997	140	123	17	17	123	12.1
1998	139	120	19	26	113	18.7
1999	167	136	31	51	116	30.5
2000	199	164	35	84	115	42.2
2001	192	147	45	96	96	50.0
2002	184	149	35	66	118	36.0
2003	148	120	28	55	93	37.2
2004	155	127	28	51	104	32.9
2005	123	98	25	44	79	35.8
Reserves						
1992	590	472	118	91	499	15.4
1993	605	490	115	97	508	16.0
1994	603	500	103	110	493	18.2
1995	630	496	134	294	336	46.7
1996	753	621	132	300	456	39.8
1997	906	785	121	349	557	38.5
1998	919	776	143	387	532	42.1
1999	994	833	161	411	583	41.3
2000	1,074	921	153	468	606	43.6
2001	967	785	182	443	524	45.8
2002	965	783	182	407	558	42.2
2003	717	598	119	262	455	36.5
2004	713	615	98	292	421	32.9
2005	688	603	85	248	440	36.0

Table D9. Deepwater Production and Proved Reserves of the Gulf of Mexico Federal Offshore, 1992-2005 (continued)

Year	Gulf of Mexico			Depth		Deepwater Percentage
	Total	Louisiana[a]	Texas	Greater than 200 meters	Less than 200 meters	
	Dry Natural Gas (billion cubic feet at 14.73 psia and 60° Fahrenheit)					
Production						
1992	4,508	3,233	1,275	162	4,346	3.6
1993	4,577	3,319	1,258	224	4,353	4.9
1994	4,725	3,440	1,285	288	4,437	6.1
1995	4,627	3,376	1,251	361	4,266	7.8
1996	4,991	3,706	1,285	544	4,447	10.9
1997	5,133	3,895	1,238	565	4,568	11.0
1998	4,872	3,728	1,144	711	4,161	14.6
1999	4,885	3,721	1,164	1,099	3,786	22.5
2000	4,773	3,626	1,147	1,165	3,608	24.4
2001	4,913	3,735	1,178	1,334	3,578	27.4
2002	4,423	3,427	996	1,328	3,095	30.0
2003	4,306	3,244	1,062	1,513	2,793	35.1
2004	3,874	2,802	1,072	1,222	2,652	31.5
2005	2,906	1,997	909	1,069	1,837	36.8
Reserves						
1992	26,649	19,653	6,996	3,225	23,424	12.1
1993	26,044	19,383	6,661	3,438	22,606	13.2
1994	27,218	20,835	6,383	4,709	22,509	17.3
1995	27,917	21,392	6,525	5,751	22,166	20.6
1996	27,852	21,856	5,996	6,322	21,530	22.7
1997	27,922	21,934	5,988	7,343	20,579	26.3
1998	26,422	20,774	5,648	7,425	18,997	28.1
1999	25,451	19,598	5,853	7,533	17,918	29.6
2000	26,172	19,788	6,384	8,506	17,666	32.5
2001	26,456	19,721	6,735	10,943	15,513	41.4
2002	24,689	18,500	6,189	10,266	14,423	41.6
2003	22,059	16,728	5,331	9,835	12,224	44.6
2004	18,812	14,685	4,127	8,379	10,433	44.5
2005	17,007	13,665	3,342	8,043	8,964	47.3

Table D9. Deepwater Production and Proved Reserves of the Gulf of Mexico Federal Offshore, 1992-2005 (continued)

Year	Gulf of Mexico			Depth		Deepwater Percentage
	Total	Louisiana[a]	Texas	Greater than 200 meters	Less than 200 meters	
	Lease Condensate (million barrels of 42 U.S. gallons)					
Production						
1992	44	35	9	2	42	4.4
1993	46	35	11	3	43	6.2
1994	47	37	10	3	44	6.1
1995	49	40	9	7	42	14.1
1996	60	49	11	8	52	12.9
1997	70	59	11	8	62	12.1
1998	72	57	15	13	59	18.7
1999	87	61	26	27	60	30.5
2000	106	76	30	45	61	42.2
2001	101	60	41	51	50	50.2
2002	90	60	30	38	52	42.2
2003	78	53	25	30	48	38.5
2004	74	49	25	27	47	36.2
2005	62	39	23	26	36	41.9
Reserves						
1992	310	226	84	48	262	15.4
1993	316	235	81	51	265	16.0
1994	311	233	78	57	254	18.2
1995	412	305	107	192	220	46.7
1996	527	422	105	210	317	39.8
1997	527	433	94	203	324	38.5
1998	557	435	122	234	323	42.1
1999	567	430	137	234	333	41.3
2000	560	433	127	244	316	43.6
2001	482	325	157	221	261	45.8
2002	454	300	154	195	259	43.0
2003	353	251	102	135	218	38.2
2004	290	205	85	103	187	35.6
2005	272	196	76	104	92	38.2

[a]Includes Federal Offshore Alabama.
Source: Based on data reported on Form EIA-23, “Annual Survey of Domestic Oil and Gas Reserves.”

Table D10. 2005 Reported Proved Nonproducing Reserves of Crude Oil, Lease Condensate, and Wet Natural Gas, After Lease Separation[a]

State and Subdivision	Crude Oil (million bbls)	Lease Condensate (million bbls)	Nonassociated Gas (bcf)	Associated Dissolved Gas (bcf)	Total Gas (bcf)
Alaska	595	0	542	14	556
Lower 48 States	**5,096**	**430**	**52,845**	**6,257**	**59,102**
Alabama	2	2	161	2	163
Arkansas	2	0	410	10	420
California	455	0	222	828	1,050
Coastal Region Onshore	70	0	2	47	49
Los Angeles Basin Onshore	112	0	0	71	71
San Joaquin Basin Onshore	238	0	220	681	901
State Offshore	35	0	0	29	29
Colorado	74	36	4,336	654	4,990
Florida	2	0	0	0	0
Kansas	16	0	161	5	166
Kentucky	5	0	113	0	113
Louisiana	193	35	3,547	274	3,821
North	17	9	2,102	39	2,141
South Onshore	148	24	1,285	207	1,492
State Offshore	28	2	160	28	188
Michigan	17	2	396	25	421
Mississippi	87	0	104	6	110
Montana	88	0	85	25	110
New Mexico	171	10	4,049	272	4,321
East	171	8	593	269	862
West	0	2	3,456	3	3,459
New York	0	0	26	0	26
North Dakota	56	1	24	30	54
Ohio	7	0	124	8	132
Oklahoma	101	47	4,454	72	4,526
Pennsylvania	0	0	420	36	456
Texas	828	101	17,096	1,106	18,202
RRC District 1	15	2	352	16	368
RRC District 2 Onshore	16	3	564	34	598
RRC District 3 Onshore	19	22	845	59	904
RRC District 4 Onshore	17	30	3,429	44	3,473
RRC District 5	1	1	3,981	19	4,000
RRC District 6	3	15	2,684	24	2,708
RRC District 7B	3	0	312	5	317
RRC District 7C	31	2	1,151	132	1,283
RRC District 8	333	1	1,354	303	1,657
RRC District 8A	374	1	3	407	410
RRC District 9	9	2	1,097	15	1,112
RRC District 10	6	21	1,290	46	1,336
State Offshore	1	1	34	2	36
Utah	52	13	1,379	78	1,457
Virginia	0	0	696	0	696
West Virginia	0	0	586	1	587
Wyoming	249	49	7,847	64	7,911
Federal Offshore[b]	2,687	134	6,581	2,761	9,342
Pacific (California)	32	8	48	50	98
Gulf of Mexico (Louisiana)[b]	2,591	95	5,235	2,578	7,813
Gulf of Mexico (Texas)	64	31	1,298	133	1,431
Miscellaneous[c]	4	0	28	0	28
U.S. Total	**5,691**	**430**	**53,387**	**6,271**	**59,658**

[a]Includes only those operators who produced during the report year 400,000 barrels of crude oil or 2 billion cubic feet of wet natural gas, or more (Category I and Category II operators).

[b]Includes Federal offshore Alabama.

[c]Includes Arizona, Maryland, Missouri, Nevada, Oregon, South Dakota and Tennessee.

Source: Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," 2005.

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Appendix E

Summary of Data Collection Operations

Appendix E

Summary of Data Collection Operations

Form EIA-23 Survey Design

The data collected on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," were used to produce this report. This section provides information concerning the survey design, response statistics, reporting requirements, and frame maintenance.

Form EIA-23 is mailed annually to all known large and intermediate size operators, and a scientifically selected sample of small operators. Operator size categories were based upon their annual production as indicated in various Federal, State, and commercial records. The term **State/subdivision** refers to an individual subdivision within a State or an individual State that is not subdivided. Operators were divided into the three size categories shown below.

- **Category I** - ***Large Operators:*** Operators who produced 1.5 million barrels or more of crude oil, or 15 billion cubic feet or more of natural gas, or both.
- **Category II** - ***Intermediate Operators:*** Operators who produced at least 400,000 barrels of crude oil or 2 billion cubic feet of natural gas, or both, but less than Category I operators.
- **Category III** - ***Small Operators:*** Operators who produced less than the Category II operators.

Category III operators were further subdivided into operators sampled with Certainty (**Certainty**) and operators that were randomly sampled (**Noncertainty**).

Data were filed for calendar year 2005 by crude oil or natural gas well operators who were active as of December 31, 2005. EIA defines an operator as an organization or person responsible for the management and day-to-day operation of crude oil or natural gas wells. The purpose of this definition is to eliminate responses from royalty owners, working interest owners (unless they are also operators), and others not directly responsible for operations. An operator need not be a separately incorporated entity. To minimize reporting burden, corporations are permitted to report on the basis of operating units of the company convenient for them. A large corporation may be represented by a single form or by several forms.

Table E1 shows a comparison of the EIA-23 sample and sampling frame between 1998 and 2005, and depicts the number of active operators, with 2002 showing the largest in the series. The 2005 sampling frame consisted of 172 Category I, 522 Category II, 195 Category III Certainty, and 14,269 Category III Noncertainty operators, for a total of 15,158 active operators. The survey sample consisted of 889 operators selected with certainty that included all of the Category I and II Certainty operators, the 195 smaller operators that were selected with certainty because of their size in relation to the area or areas in which they operated, and 505 Noncertainty operators selected as a systematic random sample of the remaining operators.

Form EIA-23 Response Statistics

Each company and its parent company or subsidiaries were required to file Form EIA-23 if they met the survey specifications. Response to the 2005 survey is summarized in **Table E2**. EIA makes a considerable effort to gain responses from all operators. About 3.4 percent of those selected turned out to be nonoperators (those that reported being nonoperators during the report year and operators that could not be located). Of the 47 nonoperators, 8 had successor operators that had taken over the production of the nonoperator. These successor operators were subsequently sampled. The overall response rate for the 2005 survey was 96 percent. For the 51 operators that did not respond, production data was obtained from State or other sources.

Form EIA-23 Reporting Requirements

The collection format for Form EIA-23 actually consists of two forms. The form the respondent is required to file is dependent upon the annual production levels of crude oil, natural gas, and lease condensate. Category I and Category II operators file a more detailed field

Table E1. Comparison of the EIA-23 Sample and Sampling Frame, 1997-2005

Operator Category	Number of Operators							
	1998	1999	2000	2001	2002	2003	2004	2005
Certainty								
Category I	178	177	175	179	176	164	164	172
Category II	420	399	436	485	480	512	532	522
Category III	862	648	854	559	388	399	275	195
Sampled	1,460	1,224	1,465	1,223	1,044	1,075	971	889
Percent Sampled	100	100	100	100	100	100	100	100
Noncertainty								
Sampled	1,459	1,305	1,311	644	533	479	370	505
Percent Sampled	7	7	7	3	3	3	2	4
Total								
Active Operators	23,620	22,089	22,102	22,519	22,823	20,923	20,670	15,158
Not Sampled	20,701	19,560	19,326	20,652	21,246	19,369	19,329	13,764
Sampled	2,919	R2,529	2,776	1,867	1,577	1,554	1,341	1,394
Percent Sampled	12	R11	13	8	7	7	7	9

R=Revised data.
Source: Energy Information Administration, Office of Oil and Gas.

Table E2. Form EIA-23 Survey Response Statistics, 2005

Operator Category	Original Sample Selected	Successor[a] Operators	Net[b] Category Changes	Non-[c] operators	Adjusted[d] Sample	Responding Operators		Nonresponding[e] Operators	
						Number	Percent	Number	Percent
Certainty									
Category I	172	0	7	-6	173	171	98.8	2	1.2
Category II	522	7	-40	-22	467	444	95.1	23	4.9
Category III	195	0	44	-7	232	224	96.6	8	3.4
Subtotal	889	7	11	-35	872	839	96.2	33	3.8
Noncertainty	505	1	-11	-12	483	465	96.3	18	3.7
Total	1,394	8	0	-47	1,355	1,304	96.2	51	3.8

[a]Successor operators are those, not initially sampled, that have taken over the production of a sampled operator.
[b]Net of recategorized operators in the sample (excluding nonoperators).
[c]Includes former operators reporting that they were not operators during the report year and operators that could not be located who are treated as nonoperators.
[d]Adjusted sample equals original sample plus successor operators plus net category changes minus nonoperators.
[e]For the 51 operators (2 Category I operators, 23 Category II operators, 8 Category III operators, and 18 Noncertainty operators) that did not respond, production data was obtained from State or other sources.
Source: Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves" 2005.

level data form. Category III operators file a summary report which is aggregated at a State/subdivision level.

The cover page required of all respondents identifies each operator by name and address (**Figure I1**, Appendix I). The oil and gas producing industry includes a large number of small enterprises. To minimize reporting burden, only a sample of small operators were required to file a summary report of Form EIA-23 (**Figures I2 and I3**, Appendix I). Report year production data were required by State/subdivision areas for crude oil, natural gas, and lease condensate. Proved reserves data for operators were required only for those properties where estimates existed in the respondent's records.

All Category I and Category II operators were required to file field level data on Schedule A, "Operated Proved Reserves, Production, and Related Data by Field," for each oil and/or gas field in which the respondent operated properties (**Figure I4**, Appendix I). All Category I and those Category II operators who had reserve estimates were required to file on a total operated basis for crude oil, nonassociated natural gas, associated-dissolved natural gas, and lease condensate. The following data items were required to be filed: proved reserves at the beginning and the end of the

report year, revision increases and revision decreases, sales and acquisitions, extensions, new field discoveries, new reservoirs in old fields, production, indicated additional reserves of crude oil, nonproducing reserves, field discovery year, water depth, and field location information.

Category II operators who did not have reserves estimates were required to file the field location information and report year production for the four hydrocarbon types from properties where reserves were not estimated. These respondents used Schedule B, "Footnotes," to provide clarification of reported data items when required in the instructions, or electively to provide narrative or detail to explain any data item filed (**Figure I5**, Appendix I).

Crude oil and lease condensate volumes were reported rounded to thousands of barrels of 42 U.S. gallons at 60° Fahrenheit, and natural gas volumes were reported rounded to millions of cubic feet. All natural gas volumes were requested to be reported at 60° Fahrenheit and a pressure base of 14.73 pounds per square inch absolute. Other minor report preparation standards were specified to assure that the filed data could be readily processed.

Oil and Gas Field Coding

A major effort to create standardized codes for all identified oil or gas fields throughout the United States was implemented during the 1982 survey year. Information from previous lists was reviewed and reconciled with State lists and a consolidated list was created. The publication of the *Oil and Gas Field Code Master List 2005*, in December 2005, was the 24th annual report and reflected data collected through December 2005. This list was made available to operators to assist in identifying the field code data necessary for the preparation of Form EIA-23.

Form EIA-23 Comparison with Other Data Series

Estimated crude oil, lease condensate, and natural gas production volumes from Form EIA-23 were compared with official EIA production data supplied by Federal and State oil and natural gas regulatory agencies and published in EIA's monthly and annual reports. Reports published by the Federal and State oil and natural gas regulatory agencies were used to compare specific operator production responses to these agencies with Form EIA-23 responses. When significant differences were found, responses were researched to detect and reconcile possible reporting errors.

For 2005, Form EIA-23 National estimates of production were 1,907 million barrels for crude oil and lease condensate or 17 million barrels (less than 1 percent) higher than that reported in the *Petroleum Supply Annual 2005* for crude oil and lease condensate (1,890 million barrels). Form EIA-23 National estimates of production for dry natural gas were 18,458 billion cubic feet, 214 billion cubic feet (less than 2 percent) higher than the *Natural Gas Monthly, October 2006* for 2005 dry natural gas production (18,244 billion cubic feet).

Form EIA-23 Frame Maintenance

Operator frame maintenance is a major data quality control effort. Extensive effort is expended to keep the frame as current as possible. The Form EIA-23 frame contains a listing of all crude oil and natural gas well operators in the United States and must be maintained and updated regularly in order to ensure an accurate frame from which to draw the sample for the annual crude oil and natural gas reserves survey. The original frame, created in 1977, is revised annually. In addition, outside sources, such as State publications and electronic data, and commercial information data bases such as HPDI, LLC., are used to obtain information on operator status and to update addresses for the frame each year.

A maintenance procedure is utilized in conjunction with State production records and commercial information data bases to update possible crude oil and natural gas well operators presently listed on EIA's master frame and add new operators to the master frame. This procedure identifies active operators and nonoperators which improves the frame for future sample selections for the annual survey. **Table E3** provides a summary of changes made to the Form EIA-23 frame of crude oil and natural gas well operators for the 2005 survey mailing. These changes resulted from all frame maintenance activities.

The Form EIA-23 operator frame contained a total of 68,616 entries as of December 14, 2005. Of these, 15,158 were confirmed operators. These are operators who have filed in the past or for whom the EIA has recent production data from an outside source. The remaining

Table E3. Summary of the 2005 Operator Frame Activity, Form EIA-23

Total 2004 Operator Frame	68,616
Operators	20,670
Nonoperators	47,946
Changes to 2004 Operator Status	8,020
From Nonoperator to Operator[a]	625
From Operator to Nonoperator	6,766
New Operators	629
No Changes to 2004 Operator Status	61,347
Operators	14,265
Nonoperators	47,082
Additions to 2004 Operator Frame	0
Operator	0
Nonoperator	0
Total 2005 Operator Frame	**68,616**
Operators	15,158
Nonoperators	53,458

[a]Includes operator frame activity through December 31, 2005.
[b]Relatively few additions were made since EIA ID numbers are now being recycled when no useable data is available with a specific EIA ID number. This procedure will increase the number of Nonoperator to Operator changes more than usual.

operators (including both definite and probable nonoperators) exist as a pool of names and addresses that may be added to the active list if review indicates activity.

Form EIA-64A Survey Design

The data for this report are also collected on Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production." This section provides information concerning the survey design, response statistics, reporting requirements, and frame maintenance for Form EIA-64A.

Form EIA-23 for report years 1977 and 1978 required natural gas well operators to report their natural gas data on a fully dry basis. It was discovered in the course of those surveys that many operators had little or no knowledge of the extraction of liquids from their produced natural gas streams once custody transfer had taken place. Therefore, these operators reverted to reporting the only natural gas volume data they had in their possession. These volume data were for dryer natural gas than that which had passed through the wellhead, but wetter than fully dry natural gas. With reference to **Figure E1**, they reported their volumes either at the wellhead or after removal of lease condensate in their lease or field separation facilities.

Some of the larger operators, however, also owned or operated natural gas processing plants. They reported their volumes after removal of both lease condensate and plant liquids, as required by Form EIA-23. The aggregate volumes resulting from the 1977 and 1978 surveys, therefore, were neither fully dry (as was intended) nor fully wet. They do appear to have been more dry than wet simply because the operators who reported fully dry volumes also operated properties that contained the bulk of proved natural gas reserves.

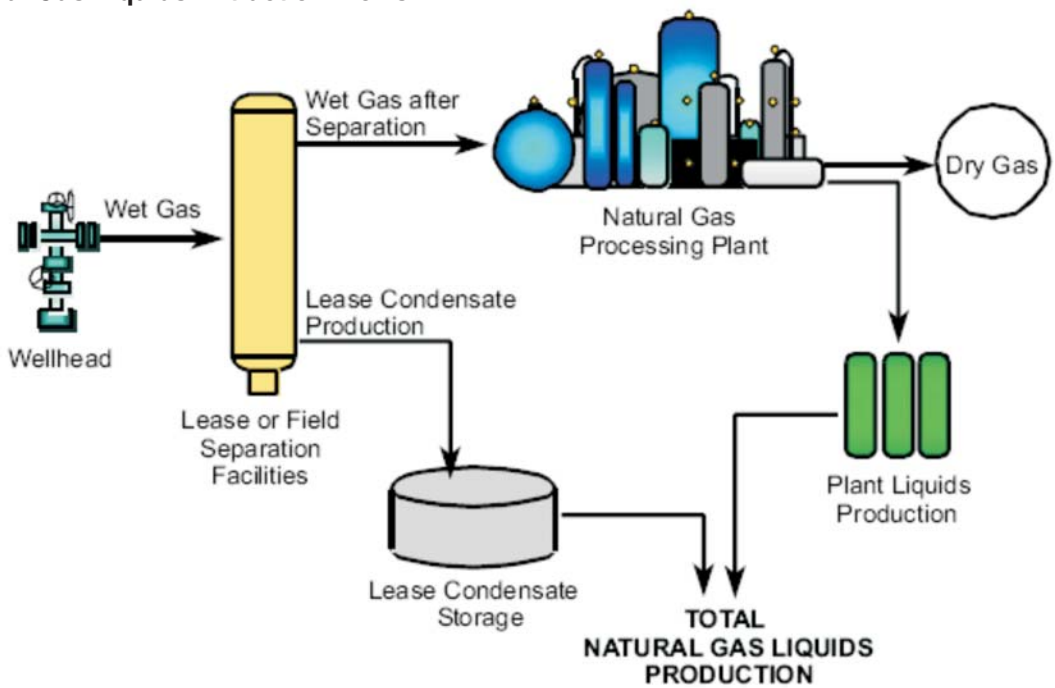
The EIA recognized that its estimates of proved reserves of natural gas liquids (NGL) had to reflect not only those volumes extractable in the future under current economic and operating conditions at the lease or field (lease condensate), but also volumes (plant liquids) extractable downstream at existing natural gas processing plants. Form EIA-64, which already canvassed these processing plants, did not request that the plants' production volumes be attributed to source areas. Beginning with the 1979 survey, a new form to collect plant liquids production according to the area or areas where their input natural gas stream had been produced was mailed to all of the operating plants. The instructions for filing the Form EIA-23 were altered to collect data from natural gas well operators that reflected those volumes of natural gas dried only through the lease or field separation facilities. The reporting basis of these volumes are referred to as "wet after lease separation." The methodology used to estimate NGL reserves by State and State subdivision is provided in Appendix F.

Form EIA-64A Response Statistics

EIA mailed EIA-64A forms to all known natural gas processing plant operators as of February 1, 2006. In addition, plant operators whose plants were shut down or dismantled during 2005 were required to complete forms for the portion of 2005 when the plants were in operation.

Natural gas processing plant operators were requested to file a Form EIA-64A for each of their plants. A total of 222 operators of 489 plants were sent forms. This number included 4 new plants, 3 reactivated plants, and 12 successor plants, all identified after the initial 2005 survey mailing. A total of 18 plants were reported as nonoperating according to the Form EIA-64A

Figure E1. Natural Gas Liquids Extraction Flows



Source: Energy Information Administration, Office of Oil and Gas.

definition. For the 18th consecutive year the response rate was 100 percent.

Form EIA-64A respondents were requested to report natural gas liquids production data by area of origin. **Table E4** summarizes the responses by plant operators of the volume and origin of natural gas delivered to the processing plants and the volume of the natural gas liquids extracted by the plants by State. The majority of the plant operators reported only one area of origin for the natural gas that was processed by a plant. The State or area of origin reported is generally also the plant's location.

Form EIA-64A Reporting Requirements

Form EIA-64A consisted of the reporting schedule shown in **Figure I6**, Appendix I. The form identifies the plant, its geographic location, the plant operator's name and address, and the parent company name. The certification was signed by a responsible official of the operating entity. The form pertains to the volume of natural gas received and of natural gas liquids produced at the plant, allocated to each area of origin. Operators also filed the data pertaining to the amount of natural gas shrinkage that resulted from extraction of natural gas liquids at the plant, and the amount of fuel used in processing.

Natural gas liquids volumes were reported rounded to thousands of barrels of 42 U.S. gallons at 60° Fahrenheit, and natural gas volumes were reported rounded to millions of cubic feet. All natural gas volumes were requested to be reported at 60° Fahrenheit and a pressure base of 14.73 pounds per square inch absolute. Other minor report preparation standards were specified to assure that the filed data could be readily processed.

Form EIA-64A Comparison with Other Data Series

Form EIA-64A plant liquids production data were compared with data collected on Form EIA-816, "Monthly Natural Gas Liquids Report." Aggregated production from Form EIA-816 represents the net volume of natural gas processing plant liquid output less input for the report year. These data are published in EIA's *Petroleum Supply Annual* reports. The Form EIA-64A annual responses reflect all corrections and

Table E4. Natural Gas Processed and Liquids Extracted at Natural Gas Processing Plants, 2005

Plant Location	Volume of Natural Gas Delivered to Processing Plants				
	State Production	Federal Production	Out of State Production	Natural Gas Processed	Total Liquids Extracted
	(million cubic feet)				(thousand barrels)
Alaska	3,089,229	0	0	3,089,229	23,700
Alabama	31,268	222,739	1,150	255,157	9,748
Arkansas	16,756	0	0	16,756	177
California	225,532	698	0	226,230	11,101
Colorado	730,948	0	0	730,948	25,603
Florida	2,069	0	1,515	3,584	359
Kansas	354,621	0	122,035	476,656	22,165
Kentucky	38,792	0	0	38,792	1,411
Louisiana	918,697	1,608,939	0	2,527,636	73,035
Michigan	34,545	0	0	34,545	2,631
Mississippi	4,773	287,250	0	292,023	10,076
Montana	10,057	0	0	10,057	851
North Dakota	63,240	0	0	63,240	5,250
New Mexico	893,586	0	0	893,586	69,261
Oklahoma	862,602	0	2,809	865,411	59,958
Texas	3,742,719	0	38,846	3,781,565	249,001
Utah	183,490	0	4,034	187,524	2,250
West Virginia	100,118	0	30,137	130,255	5,676
Wyoming	1,261,446	0	16,641	1,278,087	47,024
Miscellanous[a]	14,399	0	0	14,399	607
Total	**12,578,887**	**2,119,626**	**217,167**	**14,915,680**	**619,884**

[a]Includes Illinois, Ohio, and Pennsylvania.
Source: Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production," 2005

revisions to EIA's monthly estimates. Differences, when found, were reconciled in both sources. For 2005, the Form EIA-64A National estimates (**Table E4**) were 1 percent (6,819 thousand barrels) lower than the *Petroleum Supply Annual 2005* volume of 626,703 thousand barrels for natural gas plant liquids production.

Table E5. Form EIA-64A 200554 Plant Frame Activity

Frame as of 2004 survey mailing	488
Additions	86
Deletions	–85
Frame as of 2005 survey mailing	489

Note: Includes operator frame activity through February 15, 2006.
Source: Energy Information Administration, Office of Oil and Gas.

Form EIA-64A Frame Maintenance

The Form EIA-64A plant frame contains data on all known active and inactive natural gas processing plants in the United States. The 2005 plant frame was compared to listings of natural gas processing plants from Form EIA-816, "Monthly Natural Gas Liquids Report"; the *LPG Almanac*; and the *Oil and Gas Journal*. A list of possible additions to the plant frame was compiled. **Table E5** summarizes the Form EIA-64A plant frame changes made as a result of the comparisons as of February 15, 2006.

Appendix F

Statistical Considerations

Appendix F

Statistical Considerations

Sampling Plan

The goal was a sample that would provide estimates of reserves and production of crude oil, natural gas, and lease condensate for the United States. A stratified sample using a single stage and systematic selection with probability proportional to size was designed. The measure of size was the volume of production for crude oil, natural gas, and lease condensate by State by company in 2004. There were two strata: companies selected with certainty and companies selected under the systematic probability proportional to size design.

Operators of crude oil and natural gas wells were selected as the appropriate respondent population because they have access to the most current and detailed information, and therefore, presumably have better reserve estimates than do other possible classes of respondents, such as working interest or royalty owners. EIA conducts extensive frame maintenance activities each year to identify all current operators of crude oil and natural gas wells in the country. While large operators are quite well known, they comprise only a small portion of all operators. The small operators are not well known and are difficult to identify because they go into and out of business, alter their corporate identities, and change addresses frequently.

Sample Design

To meet survey objectives, while minimizing respondent burden, a sampling strategy has been used since 1977. EIA publishes data on reserves and production for crude oil, natural gas, and lease condensate by State for most States, and by subdivision for the States of California, Louisiana, New Mexico, and Texas.The total volume of production varies among the State/subdivisions. To meet the survey objectives while controlling total respondent burden, EIA selected the following target sampling error for the 2004 survey for each product class.

Each operator is asked to report production and reserves for crude oil, natural gas, and lease condensate for each State/subdivision in which he operates. The term State/subdivision refers to an individual subdivision within a State or an individual State that is not subdivided.

EIA selected the following target sampling error for the 2005 survey for each product class.

- 1.0 percent for National estimates and for each of the States having subdivisions: Alaska, California, Louisiana, New Mexico, and Texas.
- 2.5 percent for each State having 1 percent or more of estimated lower 48 States reserves or production in 2004 for any product class.
- 4 percent for each State/subdivision having less than 1 percent of estimated U.S. reserves or production in 2004 (lower 48 States) for all 3 product class.
- 8 percent for States not published separately.

Certainty Stratum

There are three components to the certainty stratum Category I, Category II, and certain Category III Small Operators.

- **Category I** - *Large Operators:* Operators who produced a total of 1.5 million barrels or more of crude, or 15 billion cubic feet or more of natural gas, or both in 2004.
- **Category II** - *Intermediate Operators:* Operators who produced a total of at least 400,000 barrels of crude oil or 2 billion cubic feet of natural gas, or both, but less than Category I operators in 2004, and additionally, all coalbed methane and Federal Offshore operators.
- **Category III** - *Small Operators:* Operators who produced less than the Category II operators in 2004.

Small operators were further subdivided into certainty and noncertainty strata. Small operators who satisfied any of the following criteria based upon their production shown in the operator frame are certainty operators:

- All other operators with production or reserves in a State/subdivision that exceed selected cutoff levels.

Table F1. 2005 EIA–23 Initial Number of Operators in Survey Sample

State and Subdivision	Number of Certainty Operators	Number of Multi–State Operators	Number of Noncertainty Operators	Target Error	
				Oil	Gas
Alabama Onshore	36	3	6	0.040	0.025
Alaska	9	0	0		
Arkansas	63	6	16	0.040	0.025
California - Coastal Region Onshore	16	3	2	0.080	0.080
California - Los Angeles Basin Onshore	13	3	3	0.010	0.010
California - San Joaquin Basin Onshore	42	3	6	0.025	0.040
Colorado	116	1	19	0.025	0.010
Florida - Onshore	4	0	0	0.025	0.025
Illinois	26	16	33	0.040	0.040
Indiana	21	4	28	0.040	0.080
Kansas	161	55	76	0.040	0.080
Kentucky	26	5	15	0.025	0.010
Louisiana-North	105	18	25	0.040	0.040
Louisiana-South Onshore	175	14	30	0.010	0.010
Michigan	37	5	1	0.010	0.010
Mississippi - Onshore	80	4	19	0.040	0.040
Montana	65	7	11	0.040	0.040
Nebraska	19	1	10	0.040	0.040
New Mexico - East	151	1	28	0.040	0.080
New Mexico - West	54	1	5	0.025	0.025
New York	15	4	10	0.025	0.010
North Dakota	60	2	9	0.080	0.040
Ohio	18	34	15	0.040	0.040
Oklahoma	262	118	104	0.040	0.040
Pennsylvania	43	26	19	0.025	0.025
Texas - RRC District 1	116	3	31	0.040	0.040
Texas - RRC District 2 Onshore	157	1	27	0.025	0.025
Texas - RRC District 3 Onshore	231	4	35	0.040	0.025
Texas - RRC District 4 Onshore	182	0	27	0.025	0.025
Texas - RRC District 5	94	1	10	0.040	0.010
Texas - RRC District 6	152	5	27	0.040	0.010
Texas - RRC District 7B	130	18	69	0.025	0.010
Texas - RRC District 7C	144	2	46	0.025	0.025
Texas - RRC District 8	186	0	47	0.040	0.025
Texas - RRC District 8A	157	0	43	0.010	0.010
Texas - RRC District 9	129	6	59	0.010	0.040
Texas - RRC District 10	146	18	37	0.025	0.025
Utah	54	1	2	0.040	0.010
Virginia	19	0	1	0.040	0.025
West Virginia	35	27	13	0.080	0.040
Wyoming	157	1	13	0.040	0.025
Offshore Areas	328	0	2	0.025	0.025
Other States[a]	49	8	2	0.080	0.080
Total	**[b]889**	**429**	**[b]345**	**0.010**	**0.010**

[a]Includes Arizona, Idaho, Iowa, Maryland, Missouri, Nevada, Oregon, South Dakota, Tennessee, and Washington.
[b]Nonduplicative count of operators by States.
Note: Sampling rate was 9 percent except in Alaska, Florida Onshore, Virginia, and Offshore areas where sampling rate was 100 percent.
Source: Energy Information Administration, Office of Oil and Gas.

- The largest operator in each State/subdivision regardless of level of production or reserves.
- Operators with production or reserves of oil or gas for six or more State/subdivisions.

Noncertainty Stratum

Small operators not in the certainty stratum were classified in the noncertainty stratum. They were systematically sampled with probability proportional to size. Only the operators in the following 10 states were included in the noncertainty sample: Illinois, Indiana, Kentucky, Maryland, New York, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. All other States were treated as certainty stratum.

In each State/subdivision the balance between the number of operators and the sample size was determined in an iterative procedure designed to minimize the number of total respondents. The iteration for each State/subdivision began with only the Category I and Category II operators in the certainty stratum. The size of the sample of small operators required to meet the target variance was calculated based on the variance of the volumes of those operators. For a number of State/subdivisions with high correlations between frame values across pairs of consecutive years, an adjusted target variance was calculated, that utilized the information about the correlations. This allowed the selection of a smaller sample that still met the target sampling error criteria. Independent samples of single location operators (operators who, according to the sampling frame, operate in only one State/subdivision) were selected from each State/subdivision using systematic random sampling.

State/subdivision volume estimates are calculated as the sum of the certainty strata and all of the estimates for the sampling strata in that region. The sampling variance of the estimated total is the sum of the sampling variances for the sampling strata. There is no sampling error associated with the certainty stratum. The square root of the sampling variance is the standard error. It can be used to provide confidence intervals for the State/subdivision totals.

For the States in which subdivision volume estimates are published, the State total is the sum of the individual volume estimates for the subdivisions. The U.S. total is the sum of the State estimates. A sampling variance is calculated for each State/subdivision and for the U.S. Total. **Table F1** shows sampling rates.

Total U.S. Reserve Estimates

Conceptually, the estimates of U.S. reserves and production can be thought of as the sum of the estimates for the individual States. Correspondingly, the estimates for the four States for which estimates are published separately by subdivision (California, Louisiana, New Mexico, and Texas) can be thought of as the sum of the estimates by subdivision. The remaining States are not subdivided and may be considered as a single subdivision.

The estimates of year-end proved reserves and annual production for any State/subdivision is the sum of the volumes in the State/subdivision reported by the certainty stratum operators and an estimate of the total volume in the State/subdivision by the noncertainty stratum operators. The total volume of certainty operators in the State/subdivision is simply the sum of individual operator's volumes. The estimated total volume of noncertainty operators in the State/subdivision is the weighted sum of the reports of the noncertainty sample operators.

In many State/subdivisions, the accuracy of the oil and gas estimates was improved by using the probability proportional to size procedure. This procedure took advantage of the correlation between year-to-year production reports. The weights used for estimating the oil production were different from the weights used for estimating the gas production.

The weight used for the estimation is the reciprocal of the probability of selection for the stratum from which the sample operator was selected. In making estimates for a State/ subdivision, separate weights are applied as appropriate for noncertainty operators shown in the frame as having had production in only the State/subdivision, for those shown as having had production in that State/subdivision and up to four other State/ subdivisions, and for operators with no previous record of production in the State/subdivision. National totals were then obtained by summation of the component totals.

Imputation and Estimation for Reserves Data

There were 483 operators sampled proportional to size (Table E2) that responded as Category III noncertainty operators. Only 108 of these, located in 10 states, had their data weighted and used to estimate the production and reserves of the operators that were not

sampled in those states. The remaining 375 noncertainty sampled operators were treated as certainty sampled operators with a weight of 1 and were used in states where the bulk of the operator production data was obtained from auxiliary State data (**Table F2-F5**).

The data reported by operator category on Form EIA-23 and data imputed and estimated for report year 2005 are summarized in **Tables F2, F3, F4, and F5**. The reported data in **Table F2** shows that those responding operators accounted for 93.0 percent of the published production for wet natural gas and 94.9 percent of the reserves shown in **Table 9**. Data shown in **Table F3** indicate that those responding operators accounted for 94.3 percent of the nonassociated natural gas production and 95.2 percent of the reserves published in **Table 10**. The reported data shown in **Table F4** indicate that those responding operators accounted for 89.3 percent of published crude oil production and 92.7 percent of the reserves shown in **Table 6**. Additionally, **Table F5** indicates that those responding operators accounted for 96.0 percent of the published production and 95.6 percent of the published proved reserves for lease condensate shown in **Table 15**.

In order to estimate reserve balances for National and State/subdivision levels, a series of imputation and estimation steps at the operator level must be carried out.

- Year-end reserves for operators who provided production data only were imputed on the basis of their production volumes.
- Imputation was also applied to the small and intermediate operators as necessary to provide data on each of the reserve balance categories (i.e., revisions, extensions, or new discoveries).
- Imputation was required for the natural gas data of the small operators to estimate their volumes of associated-dissolved and nonassociated natural gas.
- Adjustments to maintain reserves balance.

Methods used are discussed in the following sections.

Imputation of Year-End Proved Reserves

Category I operators were required to submit year-end estimates of proved reserves. Category II and Category III operators were required to provide year-end estimates of proved reserves only if such estimates existed in their records. Some of these respondents provided estimates for all of their operated properties, others provided estimates for only a portion of their properties, and still others provided no estimates for any of their properties. All respondents did, however, provide annual production data.

A year-end proved reserves estimate was imputed from reported production data in each case where an estimate was not provided by the respondent. A R/P function was derived and used to calculate a reserves-to-production (R/P) ratio, based on operator size and the geographic region where the operator's properties were located. The R/P function has the following functional form for each geographic region:

*Calculated P/[P+R] = Beta * EXP(Alpha * ln (1 + MOS))*

- *Alpha, Beta* = Regional Coefficients (calculated)
- *MOS = Measure of size* for a respondent, which is equal to the barrel oil equivalent volume of a respondent's 2004 production.

Table F6 lists the coefficients used for each region and the number of observations on which it was based. The regional areas used are similar to the National Petroleum Council Regions (**Figure F1**). These regions generally follow the boundaries of geologic provinces wherein the stage of resource development tends to be somewhat similar.

Once the R/P ratio was obtained for an operator, it could be multiplied by the reported or estimated production to give a proved reserves estimate. Operators that had production plus end of year reserves equal to zero were excluded from the respondents selected to calculate the R/P coefficients.

In 2004, rather than rely on a weighted sample, the R/P function was used to estimate the proved reserves of all noncertainty operators in these States: Texas, California, Colorado, Louisiana, Montana, New Mexico, South Dakota, Utah, and Wyoming. These States were chosen for this new procedure because of the many years of historical production and reserves data within EIA and availability of reliable State government and commercial production data for these States. This technique improved the correlation of EIA data with State and commercial production data, and reduced the burden of reporting and analysis on both EIA and the noncertainty operators in these States.

Imputation of Changes to Proved Reserves by Component of Change

Category II and Category III operators that do not keep reserves data were not asked to provide estimates of beginning-of-year reserves or annual changes to

Table F2. Summary of Form EIA-23 Reported, Imputed, and Estimated Natural Gas Data for 2005, Wet after Lease Separation (Million Cubic Feet at 14.73 psia and 60 Degrees Fahrenheit)

Level of Reporting	Operator Category I	II	Certainty III	Noncertainty III	Auxillary State Data	Total
			Reported			
Number of Operators	171	444	224	465	10,758	12,062
Proved Reserves as of 12/31/04	177,781,473	12,857,956	950,248	0	0	191,589,677
(+) Revision Increases	20,796,982	1,410,837	57,877	0	0	22,265,696
(-) Revision Decreases	17,935,043	1,597,926	57,101	0	0	19,590,070
(-) Sales	6,374,619	2,603,091	660,888	0	0	9,638,598
(+) Acquisitions	10,827,491	1,430,381	366	0	0	12,258,238
(+) Extensions	17,879,868	3,001,598	32,396	0	0	20,913,862
(+) New Field Discoveries	843,867	101,153	750	0	0	945,770
(+) New Reservoirs in Old Fields	855,547	334,831	4,812	0	0	1,195,190
(-) Production With Proved Reserves Reported	16,238,784	1,354,507	31,345	0	0	17,624,636
(-) Production Without Proved Reserves Reported	27,291	280,136	10,772	0	0	318,199
Proved Reserves as of 12/31/05	188,448,418	13,600,037	297,115	0	0	202,345,570
			Imputed and Estimated			
Number of Operators	-	-	-	3,096	-	3,096
Proved Reserves as of 12/31/04	-	-	-	-	-	-
(+) Revision Increases	0	0	0	0	1,099,743	1,099,743
(-) Revision Decreases	0	0	0	0	1,057,068	1,057,068
(-) Sales	0	0	0	0	0	0
(+) Acquisitions	0	0	0	0	46,214	46,214
(+) Extensions	0	0	0	0	1,157,034	1,157,034
(+) New Field Discoveries	0	0	0	0	28,436	28,436
(+) New Reservoirs in Old Fields	0	0	0	0	45,646	45,646
(-) Production With Proved Reserves Reported	0	0	0	0	88,506	88,506
(-) Production Without Proved Reserves Reported	478	214,866	77,445	292,789	644,976	1,230,554
Proved Reserves as of 12/31/05	3,150	1,958,093	727,348	2,688,591	5,592,087	10,969,269
			Total			
Number of Operators	171	444	224	3,561	10,758	15,158
Proved Reserves as of 12/31/04	177,781,473	12,857,956	950,248	0	0	191,589,677
(+) Revision Increases	20,796,982	1,410,837	57,877	0	1,099,743	23,365,439
(-) Revision Decreases	17,935,043	1,597,926	57,101	0	1,057,068	20,647,138
(-) Sales	6,374,619	2,603,091	660,888	0	0	9,638,598
(+) Acquisitions	10,827,491	1,430,381	366	0	46,214	12,304,452
(+) Extensions	17,879,868	3,001,598	32,396	0	1,157,034	22,070,896
(+) New Field Discoveries	843,867	101,153	750	0	28,436	974,206
(+) New Reservoirs in Old Fields	855,547	334,831	4,812	0	45,646	1,240,836
(-) Production With Proved Reserves Reported	16,238,784	1,354,507	31,345	0	88,506	17,713,142
(-) Production Without Proved Reserves Reported	27,769	495,002	88,217	292,789	644,976	1,548,753
Proved Reserves as of 12/31/05	188,451,568	15,558,130	1,024,463	2,688,591	5,592,087	213,314,839
			Summary			
Total Number of Operators	**171**	**444**	**224**	**3,561**	**10,758**	**15,158**
Percent of Total	**1.1%**	**2.9%**	**1.5%**	**23.5%**	**71.0%**	**100.0%**
Total Production in 2005	**16,266,553**	**1,849,509**	**119,562**	**292,789**	**733,482**	**19,261,895**
Percent of Total	**84.4%**	**9.6%**	**0.6%**	**1.5%**	**3.8%**	**100.0%**
Total Proved Reserves 12/31/05	**188,451,568**	**15,558,130**	**1,024,463**	**2,688,591**	**5,592,087**	**213,314,839**
Percent of Total	**88.3%**	**7.3%**	**0.5%**	**1.3%**	**2.6%**	**100.0%**

[a]There were 483 noncertainty responses, 108 were used with their sample weights and 375 were treated as Certainty III operators.
– = Not applicable.
Notes: Table 9 totals include imputed and estimated wet natural gas proved reserves rounded at the State/subdivision level. Field level data are reported volumes and may not balance due to submission of incomplete reserve component records.
Source: Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," 2005.

Table F3. Summary of Form EIA-23 Reported, Imputed, and Estimated Nonassociated Natural Gas Data for 2005, Wet after Lease Separation (Million Cubic Feet at 14.73 psia and 60 Degrees Fahrenheit)

Level of Reporting	Operator Category I	II	Certainty III	Noncertainty III	Auxillary State Data	Total
Reported						
Number of Operators	171	444	224	465	10,758	12,062
Proved Reserves as of 12/31/04	153,620,162	11,511,742	866,490	0	0	165,998,394
(+) Revision Increases	17,869,998	1,251,566	38,198	0	0	19,159,762
(-) Revision Decreases	16,209,272	1,471,283	55,071	0	0	17,735,626
(-) Sales	4,954,763	2,386,307	644,280	0	0	7,985,350
(+) Acquisitions	8,970,692	1,261,064	366	0	0	10,232,122
(+) Extensions	17,078,539	2,869,903	31,715	0	0	19,980,157
(+) New Field Discoveries	734,462	91,400	500	0	0	826,362
(+) New Reservoirs in Old Fields	792,116	327,197	250	0	0	1,119,563
(-) Production With Proved Reserves Reported	14,213,209	1,211,812	25,092	0	0	15,450,113
(-) Production Without Proved Reserves Reported	27,535	374,381	16,166	0	0	418,082
Proved Reserves as of 12/31/05	163,700,253	12,261,351	213,076	0	0	176,174,680
Imputed and Estimated						
Number of Operators	-	-	-	3,096	-	3,096
Proved Reserves as of 12/31/04	-	-	-	-	-	-
(+) Revision Increases	0	0	0	0	918,560	918,560
(-) Revision Decreases	0	0	0	0	877,877	877,877
(-) Sales	0	0	0	0	0	0
(+) Acquisitions	0	0	0	0	0	0
(+) Extensions	0	0	0	0	1,060,156	1,060,156
(+) New Field Discoveries	0	0	0	0	27,953	27,953
(+) New Reservoirs in Old Fields	0	0	0	0	42,222	42,222
(-) Production With Proved Reserves Reported	0	0	0	0	81,488	81,488
(-) Production Without Proved Reserves Reported	437	204,569	69,421	274,427	328,985	877,839
Proved Reserves as of 12/31/05	2,880	1,867,050	663,740	2,533,670	3,837,363	8,904,703
Total						
Number of Operators	171	444	224	3,561	10,758	15,158
Proved Reserves as of 12/31/04	153,620,162	11,511,742	866,490	0	0	165,998,394
(+) Revision Increases	17,869,998	1,251,566	38,198	0	918,560	20,078,322
(-) Revision Decreases	16,209,272	1,471,283	55,071	0	877,877	18,613,503
(-) Sales	4,954,763	2,386,307	644,280	0	0	7,985,350
(+) Acquisitions	8,970,692	1,261,064	366	0	0	10,232,122
(+) Extensions	17,078,539	2,869,903	31,715	0	1,060,156	21,040,313
(+) New Field Discoveries	734,462	91,400	500	0	27,953	854,315
(+) New Reservoirs in Old Fields	792,116	327,197	250	0	42,222	1,161,785
(-) Production With Proved Reserves Reported	14,213,209	1,211,812	25,092	0	81,488	15,531,601
(-) Production Without Proved Reserves Reported	27,972	578,950	85,587	274,427	328,985	1,295,921
Proved Reserves as of 12/31/05	163,703,133	14,128,401	876,816	2,533,670	3,837,363	185,079,383
Summary						
Total Number of Operators	**171**	**444**	**224**	**3,561**	**10,758**	**15,158**
Percent of Total	**1.1%**	**2.9%**	**1.5%**	**23.5%**	**71.0%**	**100.0%**
Total Production in 2005	**14,241,181**	**1,790,762**	**110,679**	**274,427**	**410,473**	**16,827,522**
Percent of Total	**84.6%**	**10.6%**	**0.7%**	**1.6%**	**2.4%**	**100.0%**
Total Proved Reserves 12/31/05	**163,703,133**	**14,128,401**	**876,816**	**2,533,670**	**3,837,363**	**185,079,383**
Percent of Total	**88.5%**	**7.6%**	**0.5%**	**1.4%**	**2.1%**	**100.0%**

[a]There were 483 noncertainty responses, 108 were used with their sample weights and 375 were treated as Certainty III operators.
– = Not applicable.
Notes: Table 10 totals include imputed and estimated nonassociated wet natural gas proved reserves rounded at the State/subdivision level. Field level data are reported volumes and may not balance due to submission of incomplete reserve component records.
Source: Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," 2005.

Table F4. Summary of Form EIA-23 Reported, Imputed, and Estimated Crude Oil Data for 2005,
(Thousand Barrels of 42 U.S. Gallons)

Level of Reporting	Operator Category I	II	Certainty III	Noncertainty III	Auxillary State Data	Total
			Reported			
Number of Operators	171	444	224	465	10,758	12,062
Proved Reserves as of 12/31/04	18,904,950	1,000,002	32,900	0	0	19,937,852
(+) Revision Increases	1,288,553	114,446	3,416	0	0	1,406,415
(-) Revision Decreases	825,873	62,647	1,052	0	0	889,572
(-) Sales	693,197	132,840	610	0	0	826,647
(+) Acquisitions	995,428	87,712	11	0	0	1,083,151
(+) Extensions	664,379	84,594	571	0	0	749,544
(+) New Field Discoveries	202,861	2,863	60	0	0	205,784
(+) New Reservoirs in Old Fields	30,778	6,805	304	0	0	37,887
(-) Production With Proved Reserves Reported	1,443,868	86,443	2,595	0	0	1,532,906
(-) Production Without Proved Reserves Reported	18	15,740	571	0	0	16,329
Proved Reserves as of 12/31/05	19,124,038	1,014,950	33,005	0	0	20,171,993
			Imputed and Estimated			
Number of Operators	-	-	-	3,096	-	3,096
Proved Reserves as of 12/31/04	-	-	-	-	-	-
(+) Revision Increases	0	0	0	0	135,588	135,588
(-) Revision Decreases	0	0	0	0	86,380	86,380
(-) Sales	0	0	0	0	0	0
(+) Acquisitions	0	0	0	0	20,839	20,839
(+) Extensions	0	0	0	0	57,298	57,298
(+) New Field Discoveries	0	0	0	0	1,165	1,165
(+) New Reservoirs in Old Fields	0	0	0	0	2,410	2,410
(-) Production With Proved Reserves Reported	0	0	0	0	14,910	14,910
(-) Production Without Proved Reserves Reported	0	21,959	9,723	31,682	107,890	171,254
Proved Reserves as of 12/31/05	0	195,457	90,771	286,228	1,011,829	1,584,285
			Total			
Number of Operators	171	444	224	3,561	10,758	15,158
Proved Reserves as of 12/31/04	18,904,950	1,000,002	32,900	0	0	19,937,852
(+) Revision Increases	1,288,553	114,446	3,416	0	135,588	1,542,003
(-) Revision Decreases	825,873	62,647	1,052	0	86,380	975,952
(-) Sales	693,197	132,840	610	0	0	826,647
(+) Acquisitions	995,428	87,712	11	0	20,839	1,103,990
(+) Extensions	664,379	84,594	571	0	57,298	806,842
(+) New Field Discoveries	202,861	2,863	60	0	1,165	206,949
(+) New Reservoirs in Old Fields	30,778	6,805	304	0	2,410	40,297
(-) Production With Proved Reserves Reported	1,443,868	86,443	2,595	0	14,910	1,547,816
(-) Production Without Proved Reserves Reported	18	37,699	10,294	31,682	107,890	187,583
Proved Reserves as of 12/31/05	19,124,038	1,210,407	123,776	286,228	1,011,829	21,756,278
			Summary			
Total Number of Operators	**171**	**444**	**224**	**3,561**	**10,758**	**15,158**
Percent of Total	**1.1%**	**2.9%**	**1.5%**	**23.5%**	**71.0%**	**100.0%**
Total Production in 2005	**1,443,886**	**124,142**	**12,889**	**31,682**	**122,800**	**1,735,399**
Percent of Total	**83.2%**	**7.2%**	**0.7%**	**1.8%**	**7.1%**	**100.0%**
Total Proved Reserves 12/31/05	**19,124,038**	**1,210,407**	**123,776**	**286,228**	**1,011,829**	**21,756,278**
Percent of Total	**87.9%**	**5.6%**	**0.6%**	**1.3%**	**4.7%**	**100.0%**

[a]There were 483 noncertainty responses, 108 were used with their sample weights and 375 were treated as Certainty III operators.
– = Not applicable.
Notes: Table 6 totals include imputed and estimated crude oil proved reserves rounded at the State/subdivision level. Field level data are reported volumes and may not balance due to submission of incomplete reserve component records.
Source: Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," 2005.

Table F5. Summary of Form EIA-23 Reported, Imputed, and Estimated Lease Condensate Data for 2005,
(Thousand Barrels of 42 U.S. Gallons)

Level of Reporting	Operator Category I	II	Certainty III	Noncertainty III	Auxillary State Data	Total
			Reported			
Number of Operators	171	444	224	465	10,758	12,062
Proved Reserves as of 12/31/04	1,060,796	106,883	5,013	0	0	1,172,692
(+) Revision Increases	190,327	20,601	441	0	0	211,369
(-) Revision Decreases	200,335	20,985	522	0	0	221,842
(-) Sales	48,196	17,673	3,493	0	0	69,362
(+) Acquisitions	102,520	16,388	0	0	0	118,908
(+) Extensions	101,703	32,560	337	0	0	134,600
(+) New Field Discoveries	4,326	758	0	0	0	5,084
(+) New Reservoirs in Old Fields	10,029	7,055	0	0	0	17,084
(-) Production With Proved Reserves Reported	148,830	14,255	254	0	0	163,339
(-) Production Without Proved Reserves Reported	134	3,643	302	0	0	4,079
Proved Reserves as of 12/31/05	1,073,140	131,490	1,522	0	0	1,206,152
			Imputed and Estimated			
Number of Operators	-	-	-	3,096	-	3,096
Proved Reserves as of 12/31/04	-	-	-	-	-	-
(+) Revision Increases	0	0	0	0	10,773	10,773
(-) Revision Decreases	0	0	0	0	10,474	10,474
(-) Sales	0	0	0	0	0	0
(+) Acquisitions	0	0	0	0	0	0
(+) Extensions	0	0	0	0	7,502	7,502
(+) New Field Discoveries	0	0	0	0	212	212
(+) New Reservoirs in Old Fields	0	0	0	0	480	480
(-) Production With Proved Reserves Reported	0	0	0	0	236	236
(-) Production Without Proved Reserves Reported	0	886	424	1,310	5,218	7,838
Proved Reserves as of 12/31/05	**0**	**5,142**	**2,595**	**7,737**	**38,488**	**53,962**
			Total			
Number of Operators	171	444	224	3,561	10,758	15,158
Proved Reserves as of 12/31/04	1,060,796	106,883	5,013	0	0	1,172,692
(+) Revision Increases	190,327	20,601	441	0	10,773	222,142
(-) Revision Decreases	200,335	20,985	522	0	10,474	232,316
(-) Sales	48,196	17,673	3,493	0	0	69,362
(+) Acquisitions	102,520	16,388	0	0	0	118,908
(+) Extensions	101,703	32,560	337	0	7,502	142,102
(+) New Field Discoveries	4,326	758	0	0	212	5,296
(+) New Reservoirs in Old Fields	10,029	7,055	0	0	480	17,564
(-) Production With Proved Reserves Reported	148,830	14,255	254	0	236	163,575
(-) Production Without Proved Reserves Reported	134	4,529	726	1,310	5,218	11,917
Proved Reserves as of 12/31/05	1,073,140	136,632	4,117	7,737	38,488	1,260,114
			Summary			
Total Number of Operators	**171**	**444**	**224**	**3,561**	**10,758**	**15,158**
Percent of Total	**1.1%**	**2.9%**	**1.5%**	**23.5%**	**71.0%**	**100.0%**
Total Production in 2005	**148,964**	**18,784**	**980**	**1,310**	**5,454**	**175,492**
Percent of Total	**84.9%**	**10.7%**	**0.6%**	**0.7%**	**3.1%**	**100.0%**
Total Proved Reserves 12/31/05	**1,073,140**	**136,632**	**4,117**	**7,737**	**38,488**	**1,260,114**
Percent of Total	**85.2%**	**10.8%**	**0.3%**	**0.6%**	**3.1%**	**100.0%**

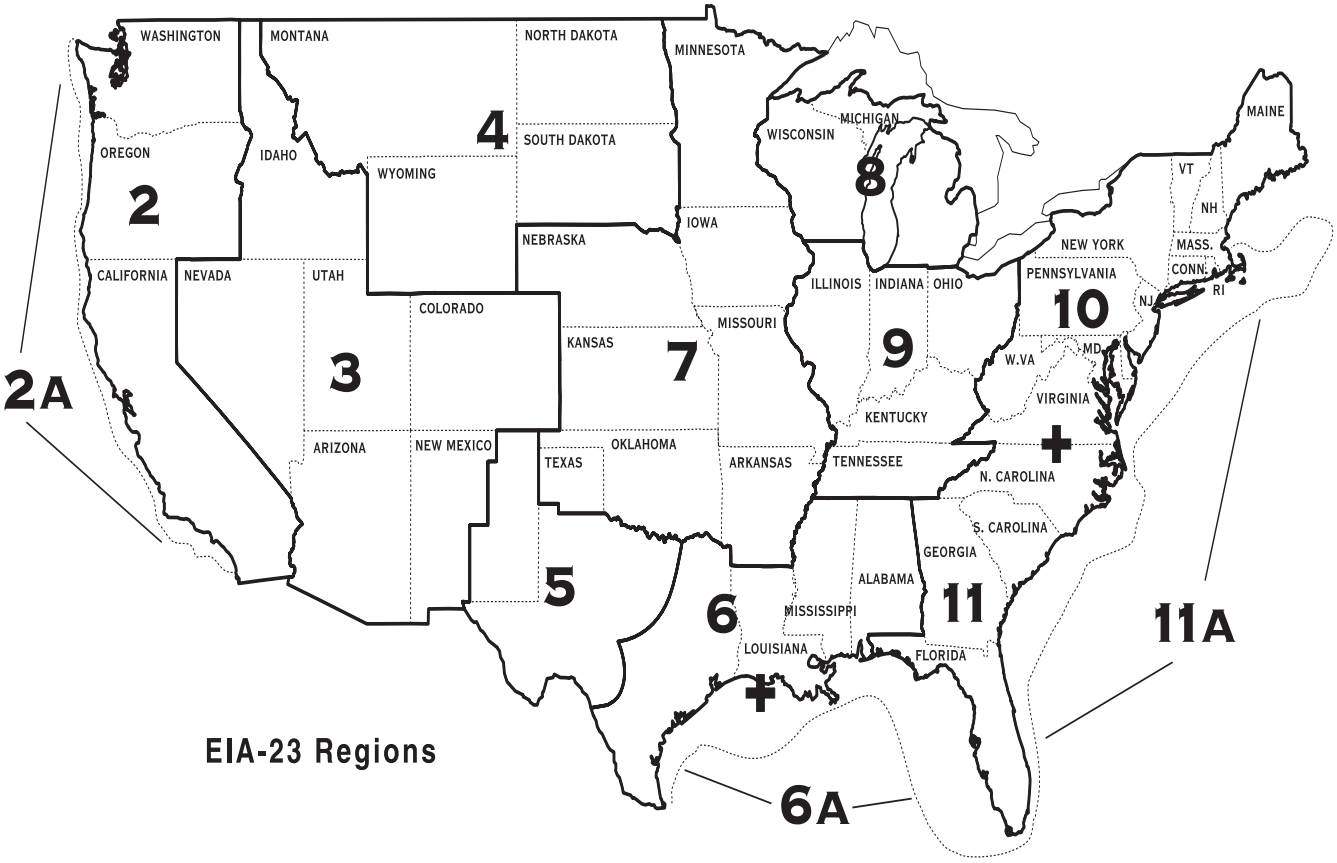
[a]There were 483 noncertainty responses, 108 were used with their sample weights and 375 were treated as Certainty III operators.
– = Not applicable.
Notes: Table 15 totals include imputed and estimated lease condensate proved reserves rounded at the State/subdivision level. Field level data are reported volumes and may not balance due to submission of incomplete reserve component records.
Source: Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," 2005.

Table F6. Statistical Parameters of Reserves Estimation Equation by Region for 2005

Region Number	Region	Number of Nonzero R/P Pairs Oil	Gas	LC	Equation Coefficients Oil Alpha	Oil Beta	Gas Alpha	Gas Beta	LC Alpha	LC Beta
1	Alaska	8	9	0	-0.1230	0.3407	-0.1351	0.4496	0.0000	0.0000
2	Pacific Coast States	42	58	5	-0.1230	0.2583	-0.1351	0.3330	-0.1170	0.3456
2A	Federal Offshore Pacific	6	5	0	-0.1230	0.2183	-0.1351	0.3590	0.0000	0.0000
3	Western Rocky Mountains	76	144	58	-0.1230	0.2175	-0.1351	0.3000	-0.1170	0.2023
4	Northern Rocky Mountains	173	174	48	-0.1230	0.2514	-0.1351	0.3191	-0.1170	0.2604
5	West Texas and East New Mexico	475	492	166	-0.1230	0.2386	-0.1351	0.3397	-0.1170	0.4877
6	Western Gulf Basin	500	847	583	-0.1230	0.3159	-0.1351	0.4036	-0.1170	0.4989
6A	Gulf of Mexico	75	140	111	-0.1230	0.4105	-0.1351	0.6535	-0.1170	0.6868
7	Mid-Continent	286	384	149	-0.1230	0.2112	-0.1351	0.3210	-0.1170	0.2687
8 + 9	Michigan Basin and Eastern Interior	77	60	17	-0.1230	0.1989	-0.1351	0.2087	-0.1170	0.2604
10 + 11	Appalachians	25	76	10	-0.1230	0.2140	-0.1351	0.1784	-0.1170	0.2551
	United States	1,743	2,389	1,147	-0.1230	0.3034	-0.1351	0.3684	-0.1170	0.4567

Source: Based on data filed on Form EIA-23,"Annual Survey of Domestic Oil and Gas Reserves, 2005".

Figure F1. Form EIA-23 Regional Boundaries



Source: Energy Information Administration, Office of Oil and Gas.

proved reserves by component of change, i.e., revisions, extensions, and discoveries. When they did not provide estimates, these volumes were estimated by either:

- applying an algebraic allocation scheme which preserved the relative relationships between these items within each State/subdivision, as reported by Category I and Category II operators, or
- applying a modified version of the R/P function to each separate component of change, calculated with its own set of geographically dependent coefficients. This method was used in all four states where the R/P Function was applied to calculate end of year reserves.

Both methods preserved an exact annual reserves balance of the following form:

Published Proved Reserves at End of Previous Report Year
+ Adjustments
+ Revision Increases
– Revision Decreases
– Sales
+ Acquisitions
+ Extensions
+ New Field Discoveries
+ New Reservoir Discoveries in Old Fields
– Report Year Production
= Published Proved Reserves at End of Report Year

The algebraic allocation method used for all but six states in the 2005 survey worked as follows: A ratio was calculated as the sum of the annual production and year-end proved reserves of those respondents who did not provide the reserves balance components, divided by the sum of year-end proved reserves and annual production of those respondents of similar size who did provide these quantities. This ratio was then multiplied by each of the reserves balance components reported by Category I and some Category II operators, to obtain imputed volumes for the reserves balances of the other Category II operators and certainty and noncertainty operators. These were then added to the State/subdivision totals.

Imputation of Natural Gas Volumes

Small operators in the certainty and noncertainty strata were not asked to segregate their natural gas volumes by type of natural gas, i.e., nonassociated natural gas (NA) and associated-dissolved natural gas (AD). The total estimated year-end proved reserves of natural gas and the total annual production of natural gas reported by, or imputed to, operators in the State/subdivision certainty and noncertainty strata were, therefore, subdivided into the NA and AD categories, by State/subdivision, in the same proportion as was reported by large and intermediate operators in the same area.

Adjustments

The instructions for Schedule A of Form EIA-23 specify that, when reporting reserves balance data, the following arithmetic equation must hold:

Proved Reserves at End of Previous Year
+ Revision Increases
– Revision Decreases
– Sales
+ Acquisitions
+ Extensions
+ New Field Discoveries
+ New Reservoir Discoveries in Old Fields
– Report Year Production
= Proved Reserves at End of Report Year

Any remaining difference in the State/subdivision annual reserves balance between the published previous year-end proved reserves and current year-end proved reserves not accounted for by the imputed reserves changes was included in the adjustments for the area. One of the primary reasons that adjustments are necessary is the instability of the noncertainty operators sampled each year. There is no guarantee that in the smaller producing States/subdivision the same number of small operators will be selected each year, or that the operators selected will be of comparable sizes when paired with operators selected in a prior year. Thus, some instability of this stratum from year to year is unavoidable, resulting in minor adjustments.

Some of the adjustments are, however, more substantial, and could be required for any one or more of the following reasons:

- The frame coverage may or may not have improved between survey years, such that more or fewer certainty operators were included in 2005 than in 2004.
- One or more operators may have reported data incorrectly on Schedule A in 2005 or 2004, but not both, and the error was not detected by edit processing.

- Operation of properties was transferred during 2005 from operators not in the frame or noncertainty operators not selected for the sample to certainty operators or noncertainty operators selected for the sample.
- Respondent changed classification of natural gas from NA to AD or vice versa.
- The trend in reserve changes imputed for the small operators, which was based on the trend reported by the large operators, did not reflect the actual trend for the small operators.
- noncertainty operators, who have grown substantially in size since they were added to the frame, occasionally cause a larger standard error than expected.
- The noncertainty sample for either year in a state may have been an unusual one.

The causes of adjustments are known for some but not all areas. The only problems whose effects cannot be expected to balance over a period of several years are those associated with an inadequate frame or those associated with any actual trend in reserves changes for small operators not being the same as those for large operators. EIA continues to attempt to improve sources of operator data to resolve problems in frame completeness.

Sampling Reliability of the Estimates

The sample of noncertainty operators selected is only one of the large number of possible samples that could have been selected and each would have resulted in different estimates. The standard error or sampling error of the estimates provides a measure of this variability. When probability sampling methods are used, as in the EIA-23 survey, the sampling error of estimates can also be estimated from the survey data.

The estimated sampling error can be used to compute a confidence interval around the survey estimate, with a prescribed degree of confidence that the interval covers the value that would have been obtained if all operators in the frame had been surveyed. If the estimated volume is denoted by V_s and its sampling error by $S.E.(V_s)$, the confidence interval can be expressed as:

$$V_s \pm k\ S.E.(V_s)$$

where k is a multiple selected to provide the desired level of confidence. For this survey, k was taken equal to 2. Then there is approximately 95 percent confidence that the interval:

$$V_s \pm 2\ S.E.(V_s)$$

includes the universe value, for both the estimates of reserves and production volumes. Correspondingly, for approximately 95 percent of the estimates in this report, the difference between the published estimate and the value that would be found from a complete survey of all operators is expected to be less than twice the sampling error of the estimate. **Tables F7 and F8** provide estimates for $2S.E.(V_s)$ by product. These estimates are directly applicable for constructing approximate 95 percent confidence intervals. For example, the 95 percent confidence interval for dry natural gas proved reserves is 204,853 ± 103 billion cubic feet. The sampling error of V_s is equal to the sampling error of the noncertainty estimate V_{sr} because the certainty total is not subject to sampling error. The estimated sampling error of a noncertainty estimate is the square root of its estimated sampling variance.

Sources of Errors

The EIA maintains an evaluation program to assess the accuracy and quality of proved reserve estimates gathered on Form EIA-23. Field teams consisting of petroleum engineers from EIA's Reserves and Production Division conduct technical reviews of reserve estimates and independently estimate the proved reserves of a selected sample of operator properties. The results of these reviews are used to evaluate the accuracy of reported reserve estimates. Operators are apprized of the team's findings to assist them in completing future filings. The magnitude of errors due to differences between reserve volumes submitted by operators on the Form EIA-23 and those estimated by EIA petroleum engineers on their field trips were generally within accepted professional engineering standards. Several sources of possible error, apart from sampling error, are associated with the Form EIA-23 survey:

- Operator nonresponse
- Respondent estimation errors
- Reporting errors and data processing errors
- Inadequate frame coverage
- Errors associated with statistical estimates.

Imputation for Operator Nonresponse

The nonresponse rate for certainty operators for the 2005 survey was 3.8 percent and for the noncertainty operators 3.7 percent. An imputation was made for the

production and reserves for the 51 nonresponding operators.

Respondent Estimation Errors

The principal data elements of the Form EIA-23 survey consist of respondent estimates of proved reserves of crude oil, natural gas, and lease condensate. Unavoidably, the respondents are bound to make some estimation errors, i.e., until a particular reservoir has been fully produced to its economic limit and abandoned, its reserves are not subject to direct measurement but must be inferred from limited, imperfect, or indirect evidence. A more complete discussion of the several techniques of estimating proved reserves, and the many problems inherent in the task, appears in Appendix G.

Reporting and Data Processing Errors

Reporting errors on the part of respondents are of definite concern in a survey of the magnitude and complexity of the Form EIA-23 program. Several steps were taken by EIA to minimize and detect such problems. The survey instrument itself was carefully developed, and included a detailed set of instructions for filing data, subject to a common set of definitions similar to those already used by the industry. Editing software is continually developed to detect different kinds of probable reporting errors and flag them for resolution by analysts, either through confirmation of the data by the respondent or through submission of amendments to the filed data. Data processing errors, consisting primarily of random keypunch errors, are detected by the same software.

Frame Coverage Errors

Of all the sources of controllable error connected with the Form EIA-23 survey, errors in the operator frame were expected to be the most important. If the frame does not list all operators in a given State, the sample selected from the frame for the State will not represent the entire operator population, a condition called under coverage. Under coverage is a problem with certain States, but it does not appear to be a problem with respect to the National proved reserve estimates for either crude oil or natural gas. While it is relatively straightforward to use existing sources to identify large operators and find addresses for them, such is not the case for small operators. A frame such as that used in the 2005 survey is particularly likely to be deficient in States where a large portion of total reserves and production is accounted for by small operators. EIA is continuing to work to remedy the under coverage problem in those States where it occurred.

Imputation Errors

Some error, generally expected to be small, is an inevitable result of the various estimations outlined. These imputation errors have not yet been completely addressed by EIA and it is possible that estimation methods may be altered in future surveys. Nationally, 7.3 percent of the crude oil proved reserve estimates, 5.1 percent of the wet natural gas proved reserve estimates, and 4.3 percent of the lease condensate proved reserve estimates resulted from the imputation and estimation of reserves for those certainty and noncertainty operators who did not provide estimates for all of their properties, in combination with the expansion of the sample of noncertainty operators to the full population. Errors for the latter were quantitatively calculated, as discussed in the previous section. Standard errors, for the former, would tend to cancel each other from operator to operator, and are, therefore, expected to be negligible, especially at the National level of aggregation. In States where a large share of total reserves is accounted for by Category III and smaller Category II operators, the errors are expected to be somewhat larger than in States where a large share of total reserves is accounted for by Category I and larger Category II operators.

Calculation of Reserves of Natural Gas Liquids and Dry Natural Gas

Natural Gas Liquids Reserve Balance

The published reserves, production, and reserves change statistics for crude oil, lease condensate, and natural gas, wet after lease separation, were derived from the data reported on Form EIA-23 and the application of the imputation methods discussed previously. The information collected on Form EIA-64A was then utilized in converting the estimates of the wet natural gas reserves into two components: plant liquids reserve data and dry natural gas reserve data. The total natural gas liquids reserve estimates presented in **Table 14** were computed as the sum of plant liquids estimates (**Table 15**) and lease condensate (**Table 16**) estimates.

Table F7. Factors for Confidence Intervals (2S.E.) for Crude Oil Proved Reserves and Production, 2005 (Million Barrels of 42 U.S. Gallons)

State and Subdivision	2005 Reserves	2005 Production	State and Subdivision	2005 Reserves	2005 Production
United States	5	1	Montana[b]	0	0
Alabama[b]	0	0	Nebraska	0	0
Alaska[a]	0	0	New Mexico[b]	0	0
Arkansas[b]	0	0	North Dakota[b]	0	0
California[b]	0	0	Ohio[b]	0	0
Colorado[b]	0	0	Oklahoma[b]	0	0
Florida[a]	0	0	Pennsylvania	0	0
Illinois	0	0	Texas[b]	0	0
Indiana	0	0	Utah[b]	0	0
Kansas[b]	0	0	Virginia[a]	0	0
Kentucky	1	0	West Virginia	0	0
Louisiana[b]	0	0	Wyoming[b]	0	0
Michigan[b]	0	0	Federal Offshore[a]	0	0
Mississippi[b]	0	0	Miscellaneous[c]	2	0

[a]Sampling rate was 100 percent in Alaska, Florida Onshore, Virginia, and Offshore areas.
[b]Sampling was not used. Estimates for each operator were made using an imputation function.
[c]Includes Arizona, Missouri, Nevada, South Dakota, Tennessee, and Virginia.
Notes: Confidence intervals are associated with Table 6 reserves and production data.
Factors for confidence intervals for each State and the United States are independently estimated and do not add.
Source: Factor estimates based on data filed on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," 2005.

Table F8. Factors for Confidence Intervals (2S.E.) for Natural Gas Proved Reserves and Production, Wet After Lease Separation, 2005 (Billion Cubic Feet at 14.73 psia and 60 Degrees Fahrenheit)

State and Subdivision	2005 Reserves	2005 Production	State and Subdivision	2005 Reserves	2005 Production
United States	103	9	New Mexico[b]	0	0
Alabama[b]	0	0	New York[b]	0	0
Alaska[a]	0	0	North Dakota[b]	0	0
Arkansas[b]	0	0	Ohio[b]	0	0
California[b]	0	0	Oklahoma[b]	0	0
Colorado[b]	0	0	Pennsylvania	16	2
Florida[a]	0	0	Texas[b]	0	0
Kansas[b]	0	0	Utah[b]	0	0
Kentucky	0	0	Virginia[a]	0	0
Louisiana[b]	0	0	West Virginia	24	2
Michigan[b]	0	0	Wyoming[b]	0	0
Mississippi[b]	0	0	Federal Offshore[a c]	0	0
Montana[b]	0	0	Miscellaneous[d]	2	1

[a]Sampling rate was 100 percent in Alaska, Florida Onshore, Virginia, and Offshore areas.
[b]Sampling was not used. Estimates for each operator were made using an imputation function.
[c]Includes Federal offshore Alabama.
[d]Includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.
Notes: Confidence intervals are associated with Table 8 reserves and production data.
Factors for confidence intervals for each State and the United States are independently estimated and do not add.
Source: Factor estimates based on data filed on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," 2005

To generate estimates for each element in the reserves balance for plant liquids in a given producing area, the first step was to group all natural gas processing plants that reported this area as an area-of-origin on their Form EIA-64A, and then sum the liquids production attributed to this area over all respondents. Next, the ratio of the liquids production to the total wet natural gas production for the area was determined. This ratio represented the percentage of the wet natural gas that was recovered as natural gas liquids. Finally, it was assumed that this ratio was applicable to the reserves and each component of reserve changes (except adjustments), as well as production. Therefore, each element in the wet natural gas reserves balance was multiplied by this recovery factor to yield the corresponding estimate for plant liquids. Adjustments of natural gas liquids were set equal to the difference between the end of previous year reserve estimates, based upon the current report year Form EIA-23 and Form EIA-64A surveys, and the end of current year reserve estimates published in the preceding year's annual reserves report.

Natural Gas Reserve Balance

This procedure involved downward adjustments of the natural gas data, wet after lease separation, in estimating the volumes of natural gas on a fully dry basis. These reductions were based on estimates of the gaseous equivalents of the liquids removed (in the case of production), or expected to be removed (in the case of reserves), from the natural gas stream at natural gas processing plants. Form EIA-64A collected the volumetric reduction, or shrinkage, of the input natural gas stream that resulted from the removal of the NGL at each natural gas processing plant.

The shrinkage volume was then allocated to the plant's reported area or areas of origin. Because shrinkage is, by definition, roughly in proportion to the NGL recovered, i.e. the NGL produced, the allocation was in proportion to the reported NGL volumes for each area of origin. However, these derived shrinkage volumes were rejected if the ratio between the shrinkage and the NGL production (gas equivalents ratio) fell outside certain limits of physical accuracy. The ratio was expected to range between 1.558 MMCF per thousand barrels (where NGL consists primarily of ethane) and 0.940 MMCF per thousand barrels (where NGL consists primarily of natural gasolines). When the computed gas equivalents ratio fell outside these limits, an imputed ratio was utilized to estimate the plant's natural gas shrinkage allocation to each reported area of origin.

This imputed ratio was that calculated for the aggregate of all other plants reporting production and shrinkage, and having a gas equivalent ratio within the aforesaid limits, from the area in question. The imputed area ratio was applied only if there were at least five plants to base its computation on. If there were less than five plants, the imputed ratio was calculated based on all plants in the survey whose individual gas equivalents ratio was within the acceptable limits. Less than one percent of the liquids production was associated with shrinkage volumes imputed in this manner. Based on the 2005 Form EIA-64A survey, the national weighted average gas equivalents ratio was computed to be 1,414 cubic feet of natural gas shrinkage per barrel of NGL recovered. The total shrinkage volume (reported plus imputed) for all plants reporting a given area of origin was then subtracted from the estimated value of natural gas production, wet after lease separation, yielding dry natural gas production for the area. The amount of the reduction in the wet natural gas production was then expressed as a percentage of the wet natural gas production. Dry natural gas reserves and reserve changes were determined by reducing the wet natural gas reserves and reserve changes by the same percentage reduction factor.

A further refinement of the estimation process was used to generate an estimate of the natural gas liquids reserves in those States with coalbed methane fields. The States where this procedure was applied were Alabama, Colorado, Kansas, New Mexico, Oklahoma, Pennsylvania, Utah, Virginia, West Virginia, and Wyoming. The first step in the process was to identify all Form EIA-23 reported coalbed methane fields. Coalbed methane fields contain no extractable natural gas liquids. Therefore, when the normal shrinkage procedure was applied to the wet gas volume reserve components, the estimate of State coalbed methane volumes were excluded and were not reduced for liquid extraction. Following the computation for shrinkage, each coalbed field gas volume reserve components was added back to each of the dry gas volume reserve components in a State. The effect of this is that the large increases in reserves in some States from coalbed methane fields did not cause corresponding increases in the State natural gas liquids proved reserves.

Appendix G

Estimation of Reserves and Resources

Appendix G

Estimation of Reserves and Resources

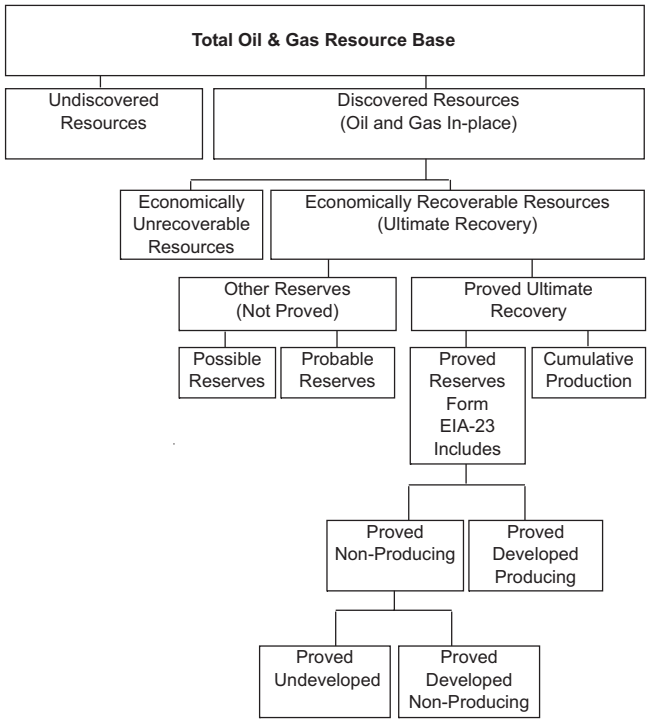
Oil and Gas Resource Base

Universally accepted definitions have not been developed for the many terms used by geologists, engineers, accountants and others to denote various components of overall oil and gas resources. In part, this is because most of these terms describe estimated and therefore uncertain, rather than measured, quantities. The lack of standardized terminology sometimes leads to inaccurate understanding of the meaning and/or import of estimates. Particularly common is an apparently widespread lack of understanding of the substantial difference between the terms "reserves" and "resources", as indicated by the frequent misuse of either term in place of the other.

The total resource base of oil and gas is the entire volume formed and trapped in–place within the Earth before any production. The largest portion of this total resource base is nonrecoverable by current or foreseeable technology. Most of the nonrecoverable volume occurs at very low concentrations throughout the earth's crust and cannot be extracted short of mining the rock or the application of some other approach that would consume more energy than it produced. An additional portion of the total resource base cannot be recovered because currently available production techniques cannot extract all of the in–place oil and gas even when present in commercially viable concentrations. The inability to recover all of the in–place oil and gas from a producible deposit occurs because of unfavorable economics, intractable physical forces, or a combination of both. Recoverable resources, the subset of the total resource base that is of societal and economic interest, are defined so as to exclude these nonrecoverable portions of the total resource base.

The structure presented in **Figure G1** outlines the total resource base and its components. The total resource base first consists of the recoverable and nonrecoverable portions discussed above. The next level down divides recoverable resources into discovered and undiscovered segments. Discovered resources are further separated into cumulative (i.e., all past) production, and reserves. Reserves are additionally subdivided into proved reserves and "other reserves".

Figure G1. Components of the Oil and Gas Resource Base



Source: Energy Information Administration, Office of Oil and Gas.

Recoverable Resources

Discovered recoverable resources are those economically recoverable quantities of oil and gas for which specific locations are known. While the specific locations of estimated undiscovered recoverable resources are not yet known, they are believed to exist in geologically favorable settings.

Current estimates of undiscovered recoverable resources merit discussion in order to provide a useful sense of scale relative to proved reserves. The sources of official estimates of domestic undiscovered recoverable resources are two agencies of the Department of the Interior (DOI), the United States Geological Survey (USGS) for onshore areas and those offshore waters subject to State jurisdiction, and the Minerals Management Service (MMS) for those offshore waters under Federal jurisdiction.

The USGS defines undiscovered recoverable conventional resources as those expected to be resident in accumulations of sufficient size and quality that they could be produced using conventional recovery technologies, without regard to present economic viability. Therefore, only part of the USGS undiscovered recoverable conventional resource is economically recoverable now. The USGS also defines a class of resources that occur in "continuous–type" accumulations. Unlike conventional oil and gas accumulations, continuous–type accumulations do not occur in discrete reservoirs of limited areal extent. They include accumulations in low–permeability (tight) sandstones, shales, and chalks, and those in coal beds. Again, only part of the continuous–type technically recoverable resource is economically recoverable now. In fact, only a small portion of the in–place continuous–type resource accumulations are estimated to be technically recoverable now. **Table G1** presents a compilation of USGS and MMS estimates.

Technically recoverable resources of dry natural gas (discovered, unproved, and undiscovered) are estimated at 1,431 trillion cubic feet (**Table G1**). Adding the 2005 U.S. proved reserves of 204 trillion cubic feet yields a technically recoverable resource target of 1,635 trillion cubic feet. This is about 89 times the 2005 dry gas production level.

Other organizations have also estimated unproven technically recoverable gas resources. For example, the Potential Gas Committee (PGC), an industry sponsored group, provides detailed geology–based gas resource estimates every 2 years. In 2000 the PGC mean estimate of potential gas resources was 1,091 trillion cubic feet, about 340 trillion cubic feet less than the estimates in **Table G1**. Another recent estimate was made by the National Petroleum Council (NPC), an industry–based group that serves in an advisory capacity to the U.S. Secretary of Energy. The NPC's estimate, based on data available at year–end 1999, was 1,555 trillion cubic feet, 124 trillion cubic feet more than the estimates summarized in **Table G1**. The differences among these estimates are usually due to the availability of newer data, differences in coverage or resource category definitions, and legitimate but differing data interpretations.

While the estimation of undiscovered resources is certainly a more imprecise endeavor than is the estimation of proved reserves, it is clear that substantial volumes of technically recoverable oil and gas resources remain to be found and produced domestically. Current estimates indicate that as much domestic gas remains to be found and then produced as has been to date. Of course, much effort, investment and time will be required to bring this gas to market.

There is a perception that the oil resource base has been more intensively developed than the gas resource base. And in fact, more oil has been produced in the United States than is estimated as remaining recoverable. Nevertheless, the ratio of unproven technically recoverable oil resources to 2005 oil production (**Table G1**) was about 101 to 1, higher than the comparable gas ratio.

Federal Land Resources

Estimates of technically recoverable resources that underlie Federal jurisdiction lands are listed in **Table G1**. These estimates are based on National assessments performed by the USGS and the MMS. It is estimated that 60 percent of the technically recoverable resources of crude oil, 52.4 percent of the dry gas resources, and 34.7 percent of the natural gas liquids resources underlie Federal lands.

Discovered Resources

In addition to cumulative production, which is the sum of current year production and the production in all prior years, estimates of discovered recoverable resources include estimates of reserves. Broadly, reserves are those volumes that are believed to be recoverable in the future from known deposits through the eventual application of present or anticipated technology.

Reserves

Reserves include both **proved reserves** and **other reserves**. Several different reserve classification systems are in use by different organizations, as preferred for operational reasons. These systems utilize and incorporate various definitions of terms such as *measured reserves*, *indicated reserves*, *inferred reserves*,

Table G1. Mean Estimates of Technically Recoverable Oil and Gas Resources by Deposit Type and Location

Area	Jurisdiction	Crude Oil[a] (billion barrels)	Natural Gas (Dry) (trillion cubic feet)	Natural Gas Liquids (billion barrels)
Undiscovered Conventionally Reservoired Fields				
Alaska Onshore + State Offshore	Federal	3.75	33.97	0.54
Alaska Onshore + State Offshore	Other	4.68	95.37	0.61
Alaska Federal Offshore	Federal	24.90	122.60	0.00
Lower 48 States Onshore + State Offshore	Federal	3.79	23.97	1.26
Lower 48 States Onshore + State Offshore	Other	17.83	166.41	5.64
Lower 48 States Federal Offshore	Federal	50.10	239.60	0.00
Alaska Subtotal		33.33	251.94	1.15
Alaska Percentage Federal		86.0%	62.1%	47.0%
Lower 48 States Subtotal		71.72	429.98	6.90
Lower 48 States Percentage Federal		75.1%	61.3%	18.3%
Technically Recoverable Resources in U.S. Undiscovered Conventionally Reservoired Fields		**105.05**	**681.92**	**8.05**
Percentage Federal		**78.6%**	**61.6%**	**22.4%**
Ultimate Recovery Appreciation				
U.S. Onshore + State Offshore	Federal	14.33	118.70	4.94
U.S. Onshore + State Offshore	Other	45.67	203.30	8.46
U.S. Federal Offshore	Federal	7.70	68.00	0.00
Technically Recoverable Resources in U.S. from Ultimate Recovery Appreciation in Discovered Conventionally Reservoired Fields		**67.70**	**390.00**	**13.40**
U.S. Percentage Federal		**32.5%**	**47.9%**	**36.9%**
Continuous Type Deposits				
Non-coal bed	Federal	0.32	127.08	1.45
Non-coal bed	Other	1.75	181.72	0.67
Coal bed	Federal	0.00	16.08	0.00
Coal bed	Other	0.00	33.83	0.00
Non-coal bed Subtotal		2.07	308.80	2.12
Non-coal bed Percentage Federal		15.5%	41.2%	68.4%
Coal bed Subtotal		0.00	49.91	0.00
Coal bed Percentage Federal		0.0%	32.2%	0.0%
Technically Recoverable Resources in U.S. from Continuous Type Deposits		**2.07**	**358.71**	**2.12**
Continuous Type Percentage Federal		**15.5%**	**39.9%**	**68.4%**
U.S. Totals All Sources				
U.S. Onshore + State Offshore	Federal	22.19	319.80	8.19
U.S. Onshore + State Offshore	Other	69.93	680.63	15.38
Federal Offshore	Federal	82.70	430.20	0.00
Federal Subtotal		104.89	750.00	8.19
U.S. Technically Recoverable Resources		**174.82**	**1,430.63**	**23.57**
Percentage Federal		**60.0%**	**52.4%**	**34.7%**

Notes:
Proved Reserves are not included in these estimates.
Federal Onshore excludes Indian and Native lands even when Federally managed in trust.
Zero (0) indicates either that none exists in this area or that no estimate of this resource has been made for this area.

Table G1. Mean Estimates of Technically Recoverable Oil and Gas Resources by Deposit Type and Location (continued)

Notes (continued): Federal Offshore indicates MMS estimates for Federal Offshore jurisdictions (Outer Continental Shelf and deeper water areas seaward of State Offshore).

Probable and Possible reserves are considered by USGS definition to be part of USGS Reserve Growth, but are separately considered by the MMS as its Unproved Reserves term. The USGS did not set a time limit for the duration of Reserve Growth; the MMS set the year 2020 as the time limit in its estimates of Reserve Growth in existing fields of the Gulf of Mexico.

Excluded from the estimates are undiscovered oil resources in tar deposits and oil shales, and undiscovered gas resources in geopressured brines and gas hydrates.

Data Sources: National Oil and Gas Resource Assessment Team, *1996 National Assessment of United States Oil and Gas Resources,* Circular 1118, United States Geological Survey, Washington DC, 1995.

D.L Gautier, G.L. Dolton, and E.D. Atanasi, *1995 National Oil and Gas Assessment and Onshore Federal Lands,* Open File Report 95-75-N, United States Geological Survey, Washington DC, January 1998.

Resource Evaluation Program, *Outer Continental Shelf Petroleum Assessment 2000,* Brochure 7, Minerals Management Service, Washington, DC, January 2001 at <http://www.mms.gov/revaldiv/RedNatAssessment.htm>.

Resource Evaluation Program, *An Assessment of the Undiscovered Hydrocarbon Potential of the Nation's Outer Continental Shelf,* OCS Report MMS 96-0034, Minerals Management Service, Washington, DC, 1996.

Minerals Management Service, *Mineral Revenues 1996,* U.S. Department of the Interior, Washington, DC, 1997, Table 12 on p. 33 and Table 23 on p. 70.

Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 1996 Annual Report,* Washington, DC, December 1997, Table 15 on p. 39.

Energy Information Administration, *Petroleum Supply Annual 1996,* Washington, DC, June 1997, Volume 1, Table 14 on p. 96.

Energy Information Administration, *Natural Gas Annual 1996,* Washington, DC, September 1997, Table 3 on p. 12.

probable reserves, and *possible reserves*. As used by the different organizations, the definitions that attach to these terms sometimes overlap, or the terms may require a slightly different interpretation from one organization to the next. Nevertheless, all kinds of "other reserves" are generally less well known and therefore less precisely quantifiable than proved reserves, and their eventual recovery is less assured.

Measured reserves are defined by the USGS as that part of the identified (i.e., discovered) economically recoverable resource that is estimated from geologic evidence and supported directly by engineering data.{45} They are similarly defined by the MMS, although its system also subdivides them by degree of development and producing status.{46} Measured reserves are demonstrated with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions, and are essentially equivalent to proved reserves as defined by the EIA. Effectively, estimates of proved reserves may be thought of as reasonable estimates (as opposed to exact measures) of "on–the–shelf inventory".

Inferred reserves and indicated reserves, due to their more uncertain economic or technical recoverability, are included in the "other reserves" category. The USGS defines inferred reserves as that part of the identified economically recoverable resource, over and above both measured and indicated (see below) reserves, that will be added to proved reserves in the future through extensions, revisions, and the discovery of new pay zones in already discovered fields.{45} Inferred reserves are considered equivalent to "probable reserves" by many analysts, for example, those of the PGC.

Proved Reserves

The EIA defines proved reserves as those volumes of oil and gas that geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

When deterministic proved reserves estimation methods are used, the term reasonable certainty is intended to express a high degree of confidence that the estimated quantities will be recovered. When probabilistic methods are used there should be at least a 90 percent probability that the actual quantities recovered will exceed the estimate.

Proved reserves are either proved producing or proved nonproducing (i.e., resident in reservoirs that did not produce during the report year). The latter may represent a substantial fraction of total proved reserves.

Reserve Estimation Methodologies

The adoption of a standard definition of proved reserves for each type of hydrocarbon surveyed by the Form EIA–23 program provided a far more consistent response from operators than if each operator had used their own definition. Such standards, however, do not guarantee that the resulting estimates themselves are

determinate. Regardless of the definition selected, proved reserves cannot be measured directly. They are estimated quantities that are inferred on the basis of the best geological, engineering, and economic data available to the estimator, who generally uses considerable judgment in the analysis and interpretation of the data. Consequently, the accuracy of a given estimate varies with and depends on the quality and quantity of raw data available, the estimation method used, and the training and experience of the estimator. The element of judgment commonly accounts for the differences among independent estimates for the same reservoir or field.

Data Used in Making Reserve Estimates

The raw data used in estimating proved reserves include the engineering and geological data for reservoir rock and its fluid content. These data are obtained from direct and indirect measurements. The data available for a given reservoir vary in kind, quality, and quantity. When a reservoir is first discovered only data from a single well are available, and prior to flow testing or actual production, proved reserves can only be inferred. As development of the reservoir proceeds, and flow tests are made or actual production commences, more and more data become available, enabling proved reserves estimates to become more accurate.

Many different kinds of data are useful in making reserves estimates. They may include: data on porosity, permeability, and fluid saturations of the reservoir rocks (obtained directly from core analysis or from various types of electrical measurements taken in a well or several wells); data on the production of fluids from a well or several wells; geologic maps of the areal extent, thickness, and continuity of the reservoir rocks (inferred from well logs, geophysical, and geological data); and reservoir pressure and temperature data. Also involved are economic data including the current price of crude oil and natural gas, and various developmental and operating costs.

Reserve Estimation Techniques

Depending on the kinds and amounts of data available, and a judgment on the reliability of those data, the estimator will select one of several methods of making a proved reserves estimate. Methods based on production performance data are generally more accurate than those based strictly on inference from geological and engineering data. Such methods include the *Production Decline* method (for crude oil or natural gas reservoirs), the *Material Balance* method (for crude oil reservoirs), the *Pressure Decline* method (which is actually a material balance, for natural gas reservoirs), and the *Reservoir Simulation* method (for crude oil or natural gas reservoirs). The reservoir type and production mechanisms and the types and amounts of reliable data available determine which of these methods is more appropriate for a given reservoir. These methods are of comparable accuracy.

Methods not based upon production data include the *Volumetric* method (for crude oil or natural gas reservoirs) and the *Nominal* method. Of these, the *Volumetric* method is the more accurate. Both methods, however, are less accurate than those based on production data. **Table G2** summarizes the various methods.

Table G2. Reserve Estimation Techniques

Method	Comments
Volumetric	Applies to crude oil and natural gas reservoirs. Based on raw engineering and geologic data.
Material Balance	Applies to crude oil and natural gas reservoirs. Is used in estimating reserves. Usually of more value in predicting reserves, and reservoir performance.
Pressure Decline	Applies to nonassociated and associated gas reservoirs. The method is a special case of material balance equation in the absence of water influx.
Production Decline	Applies to crude oil and natural gas reservoirs during production decline (usually in the later stages of reservoir life).
Reservoir Simulation	Applies to crude oil and natural gas reservoirs. Is used in estimating reserves. Usually of more value in predicting reservoir performance. Accuracy increases when matched with past pressure and production data.
Nominal	Applied to crude oil and natural gas reservoirs. Based on rule of thumb or analogy with another reservoir or reservoirs believed to be similar; least accurate of methods used.

Judgmental Factors in Reserve Estimation

The determination of rock and hydrocarbon fluid properties involves judgment and is subject to some uncertainty; however, the construction of the geologic maps and cross sections and the determination of the size of the reservoir are the major judgmental steps in the *Volumetric* method, and are subject to the greatest uncertainty. Estimates made using the *Material Balance* method, the *Reservoir Simulation* method, or the *Pressure Decline* method are based on the estimator's judgment that the type of reservoir drive mechanism has been identified and on the specification of abandonment conditions. Estimates based on the *Production Decline* method are subject to judgment in constructing the trend line, and are based on the estimator's assumption of reservoir performance through abandonment.

Contributing to the degree of uncertainty inherent in the above methods for estimating reserves are other factors associated with economic considerations and the perceived reservoir limits, which together influence the final reserves estimate. A brief discussion of these other factors follows.

Economic considerations: There has been continuing debate about the effects of prices on proved reserves. Although no all–inclusive statement can be made on the impact of price, the points at issue can be discussed and some general remarks can be made about some circumstances where price may be a factor.

- *Developed gas fields* – In a gas reservoir, price affects the economic limit (i.e., the production rate required to meet operating costs) and, therefore, the abandonment pressure. Thus, price change has some effect on the conversion of noneconomic hydrocarbon resources to the category of proved reserves. In both nearly depleted reservoirs and newly developed reservoirs, the actual increase in the quantity of proved reserves resulting from price rises is generally limited in terms of national volumes (even though the percentage increase for a given reservoir may be great).

- *Developed oil fields* – In developed crude oil reservoirs many of the same comments apply; however, there is an additional consideration. If the price is raised to a level sufficient to justify initiation of an improved recovery project, and if the improved recovery technique is effective, then the addition to ultimate recovery from the reservoir can be significant. Because of the speculative nature of predicting prices and costs many years into the future, proved reserves are estimated on the basis of current prices, costs, and operating practices in effect as of the date the estimation was made.

- *Successful exploration efforts* – Price can have a major impact on whether a new discovery is produced or abandoned. For example, the decision to set casing in a new onshore discovery, or to install a platform as the result of an offshore discovery, are both price–sensitive. If the decision is made to set pipe or to install a platform, the discoveries in both cases will add to the proved reserves total. If such projects are abandoned, they will make no contribution to the proved reserves total.

Effect of operating conditions: Operating conditions are subject to change caused by changes in economic conditions, unforeseen production problems, new production practices or methods, and the operator's financial position. As with economic conditions, operating conditions to be expected at the time of abandonment are speculative. Thus, current operating conditions are used in estimating proved reserves. In considering the effect of operating conditions, a distinction must be made between processes and techniques that would normally be applied by a prudent operator in producing his oil and gas, and initiation of changes in operating conditions that would require substantial new investment.

- *Compression* – Compression facilities are normally installed when the productive capacity or deliverability of a natural gas reservoir or its individual wells declines. In other cases compression is used in producing shallow, low–pressure reservoirs or reservoirs in which the pressure has declined to a level too low for the gas to flow into a higher pressure pipeline. The application of compression increases the pressure and, when economical, is used to make production into the higher pressure pipeline possible. Compression facilities normally require a significant investment and result in a change in operating conditions. It increases the proved reserves of a reservoir, and reasonably accurate estimates of the increase can be made.

- *Well stimulation* – Procedures that increase productive capacity (workovers, such as acidizing or fracturing, and other types of production practices) are routine field operations. The procedures accelerate the rate of production from the reservoir, or extend its life, and they have only small effect on proved

reserves. Reasonable estimates of their effectiveness can be made.

- *Improved recovery techniques* – These techniques involve the injection of a fluid or fluids into a reservoir to augment natural reservoir energy. Because the response of a given reservoir to the application of an improved recovery technique cannot be accurately predicted, crude oil production that may ultimately result from the application of these techniques is classified as "indicated additional reserves of crude oil" rather than as proved reserves until response of the reservoir to the technique has been demonstrated. In addition, improved recovery methods are not applicable to all crude oil reservoirs. Initiation of improved recovery techniques may require significant investment.

- *Infill drilling* – Infill drilling (drilling of additional wells within a field/reservoir) may result in a higher recovery factor, and, therefore, be economically justified. Predictions of whether infill drilling will be justified under current economic conditions are generally based on the expected production behavior of the infill wells.

Reservoir limits: The initial proved reserves estimate made from the discovery well is subject to significant uncertainty because one well provides little information on the size of the reservoir. The area proved by a discovery well is frequently estimated on the basis of experience in a given producing region. Where there is continuity of the producing formation over wide geographic areas, a relatively large proved area may be assigned. In some cases where reliable geophysical and geological data are available, a reasonable estimate of the extent of the reservoir can be made by drilling a relatively small number of delineation wells. Conversely, a relatively small proved area may be assigned when the producing formation is of limited continuity, owing to either structural or lithological factors.

Additional wells provide more information and reduce the uncertainty of the reserves estimate. As additional wells are drilled, the geometry of the reservoir and, consequently, its bulk volume, become more clearly defined. This process accounts for the large extensions to proved reserves typical of the early stages of most reservoir development.

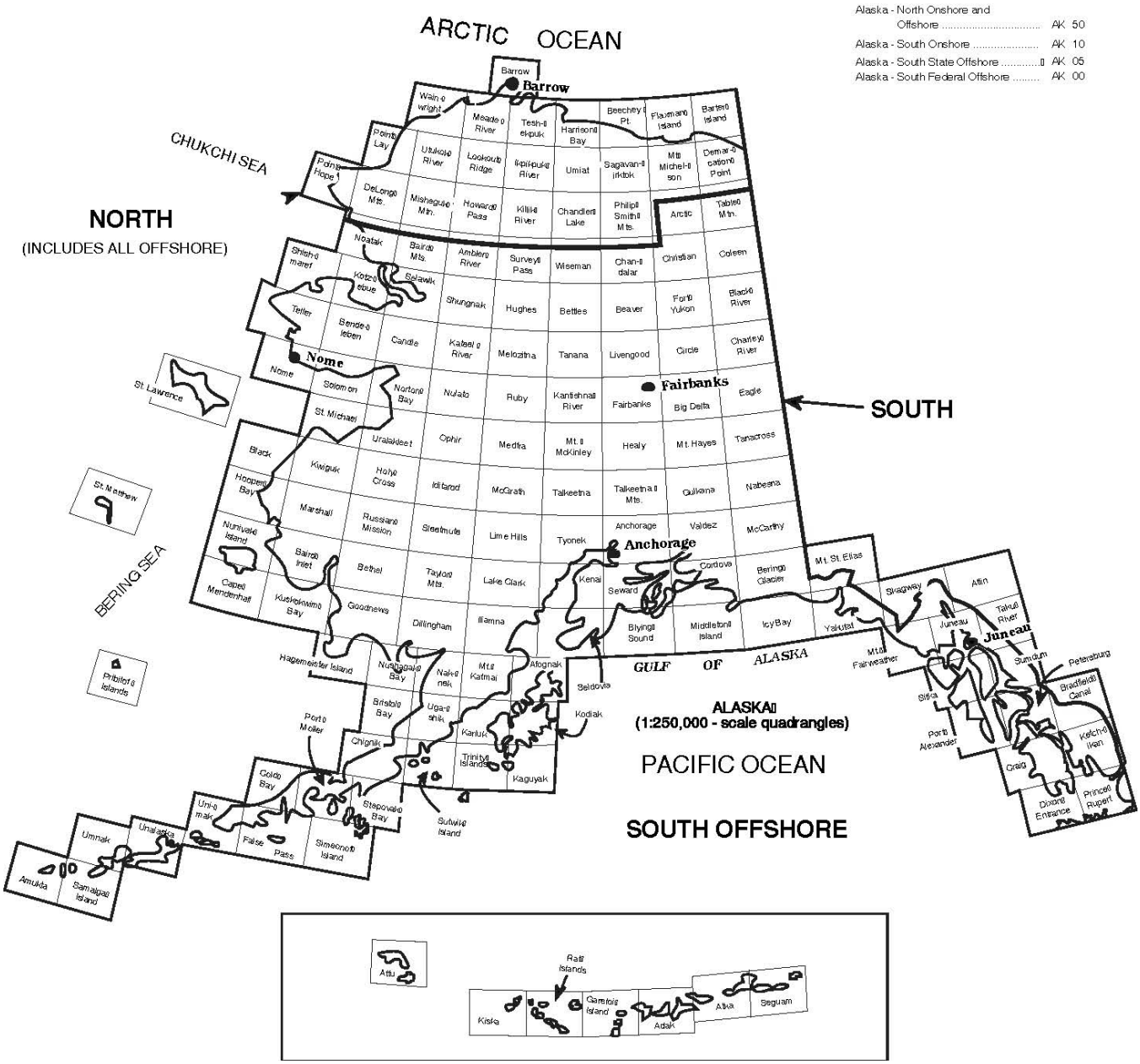
Appendix H

Maps of Selected State Subdivisions

Appendix H

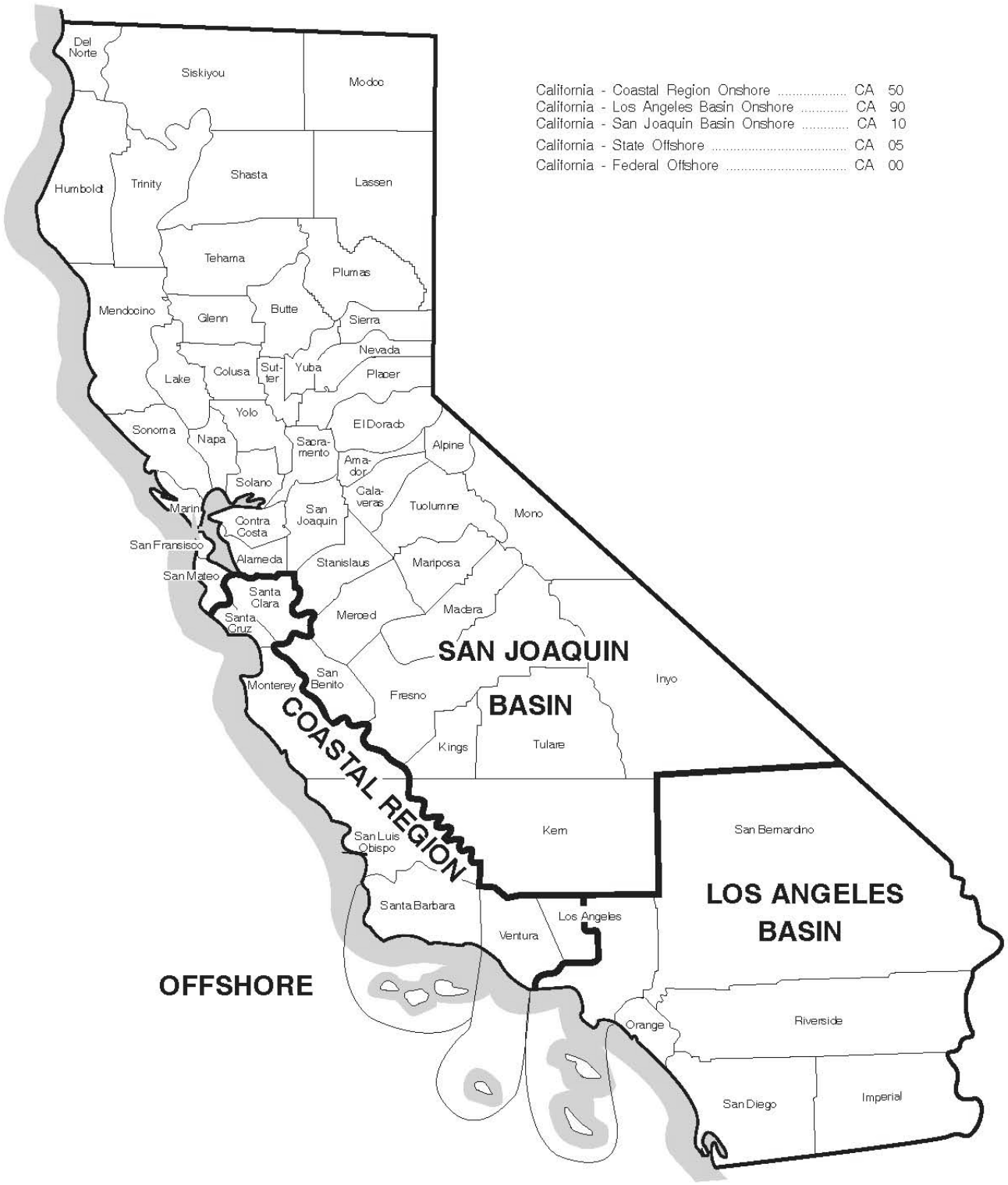
Maps of Selected State Subdivisions

Figure H1. Subdivisions of Alaska



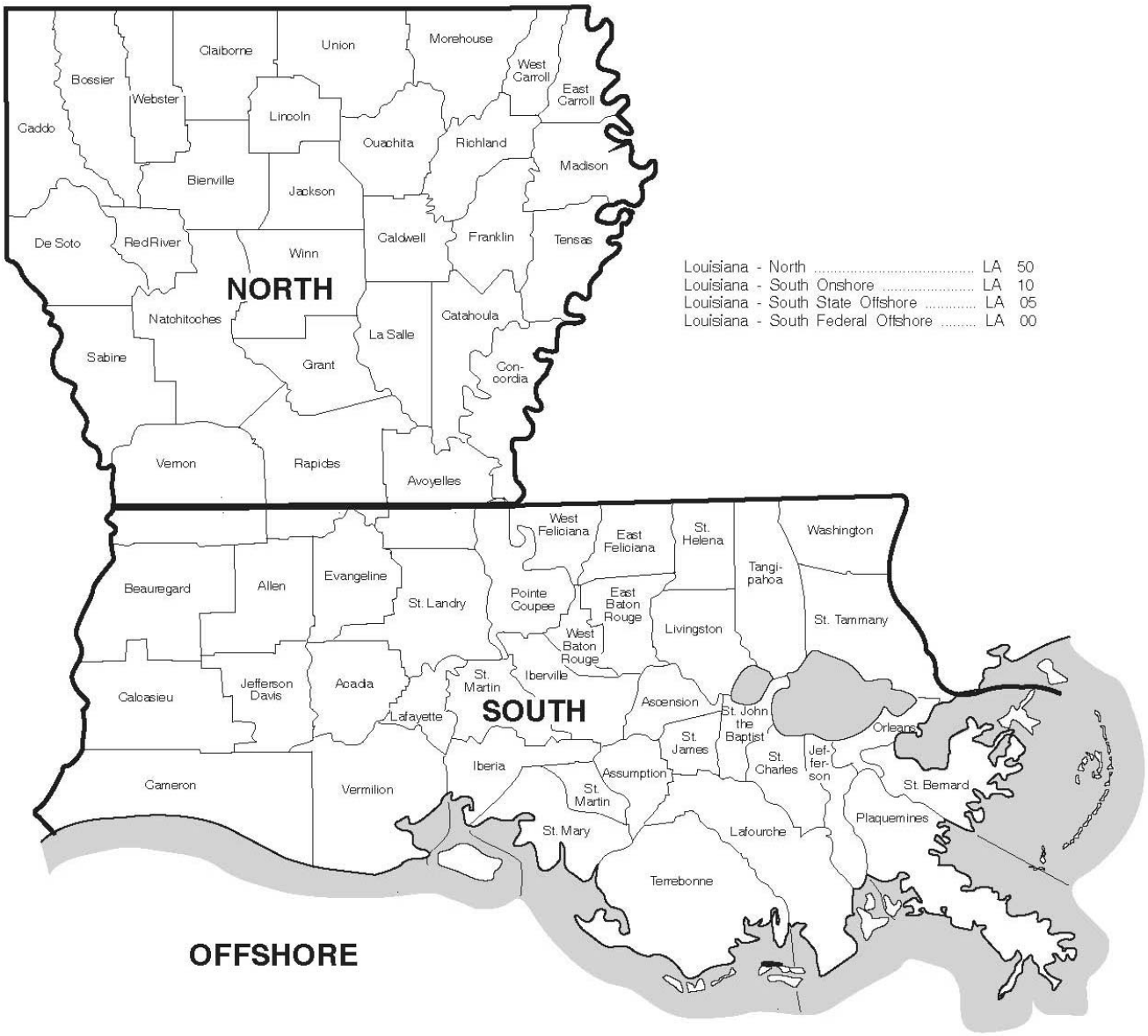
Source: After U.S. Geological Survey.

Figure H2. Subdivisions of California



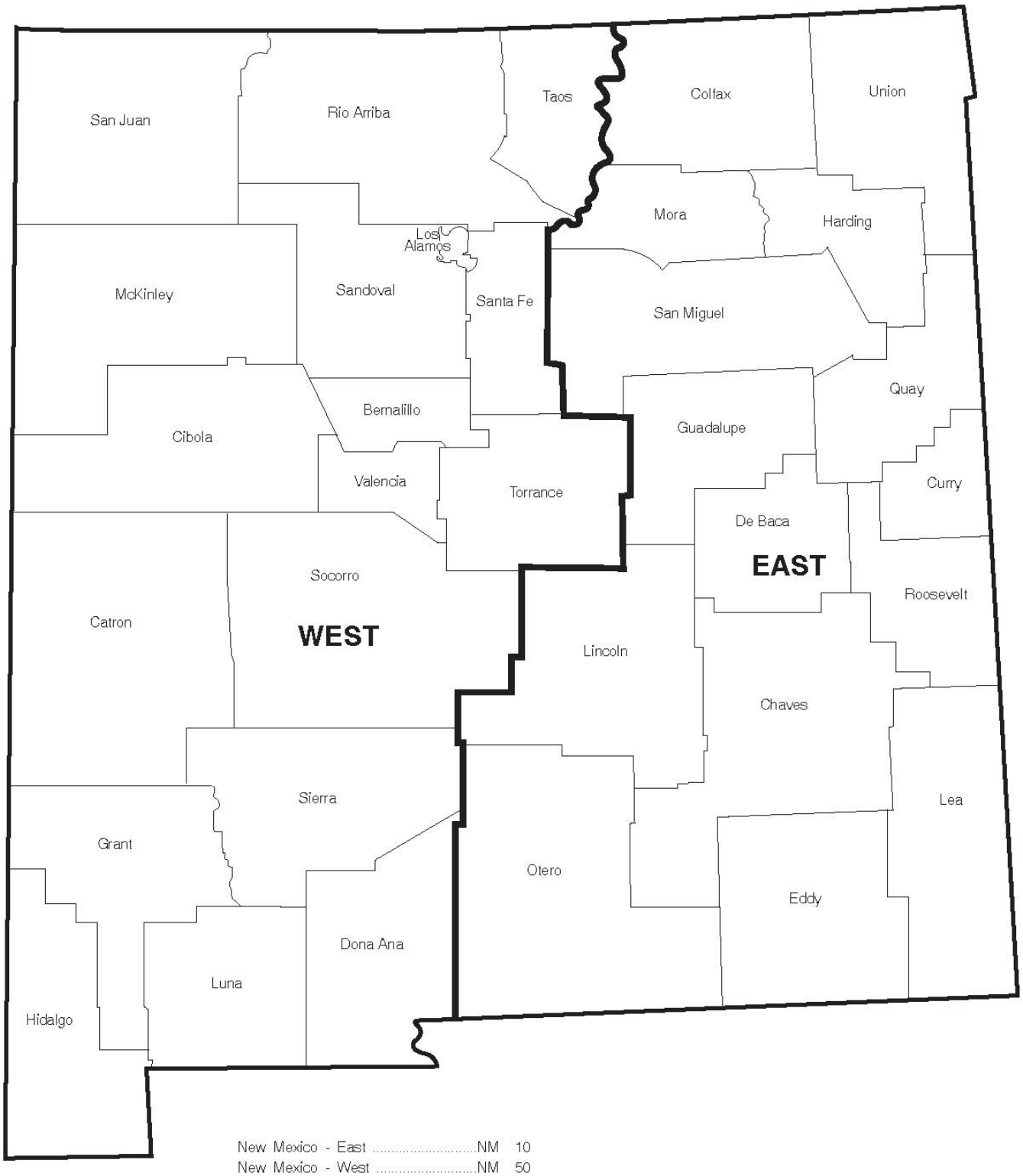
Source: Energy Information Administration, Office of Oil and Gas.

Figure H3. Subdivisions of Louisiana



Source: Energy Information Administration, Office of Oil and Gas.

Figure H4. Subdivisions of New Mexico

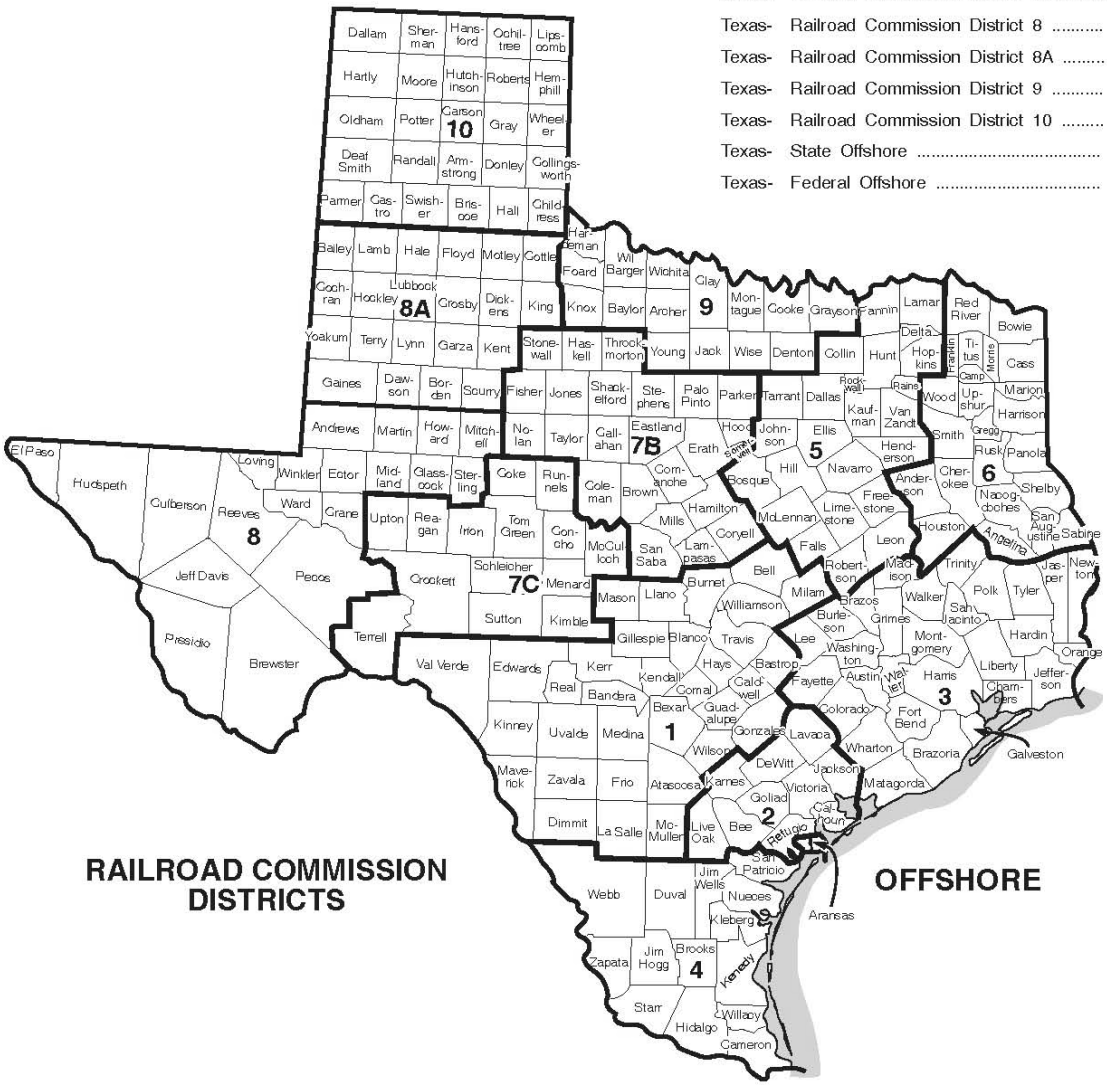


New Mexico - East .....NM 10
New Mexico - West .....NM 50

Source: Energy Information Administration, Office of Oil and Gas.

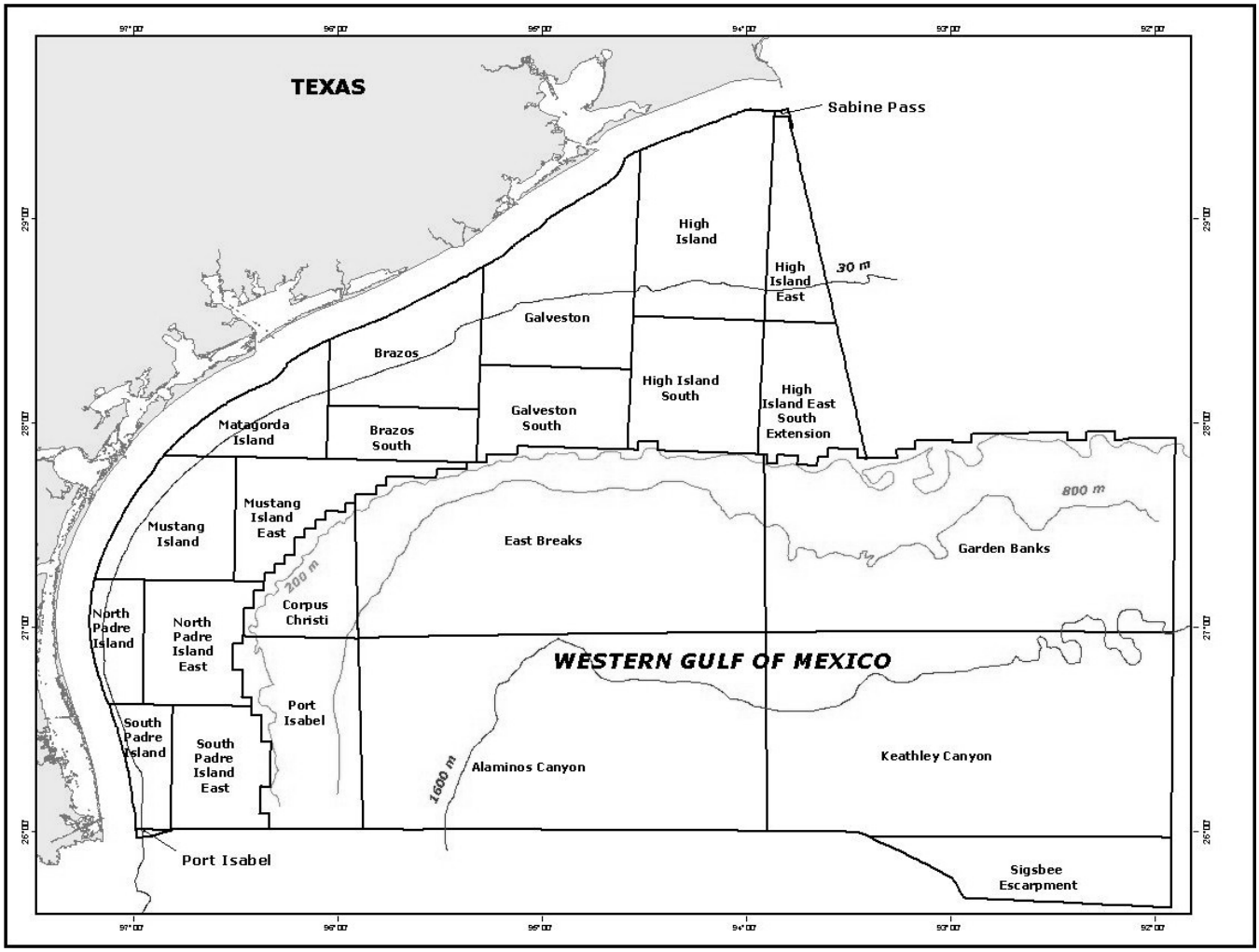
Figure H5. Subdivisions of Texas

Texas-	Railroad Commission District 1	TX 10
Texas-	Railroad Commission District 2 Onshore	TX 20
Texas-	Railroad Commission District 3 Onshore	TX 30
Texas-	Railroad Commission District 4 Onshore	TX 40
Texas-	Railroad Commission District 5	TX 50
Texas-	Railroad Commission District 6	TX 60
Texas-	Railroad Commission District 7B	TX 70
Texas-	Railroad Commission District 7C	TX 75
Texas-	Railroad Commission District 8	TX 80
Texas-	Railroad Commission District 8A	TX 85
Texas-	Railroad Commission District 9	TX 90
Texas-	Railroad Commission District 10	TX 95
Texas-	State Offshore	TX 05
Texas-	Federal Offshore	TX 00



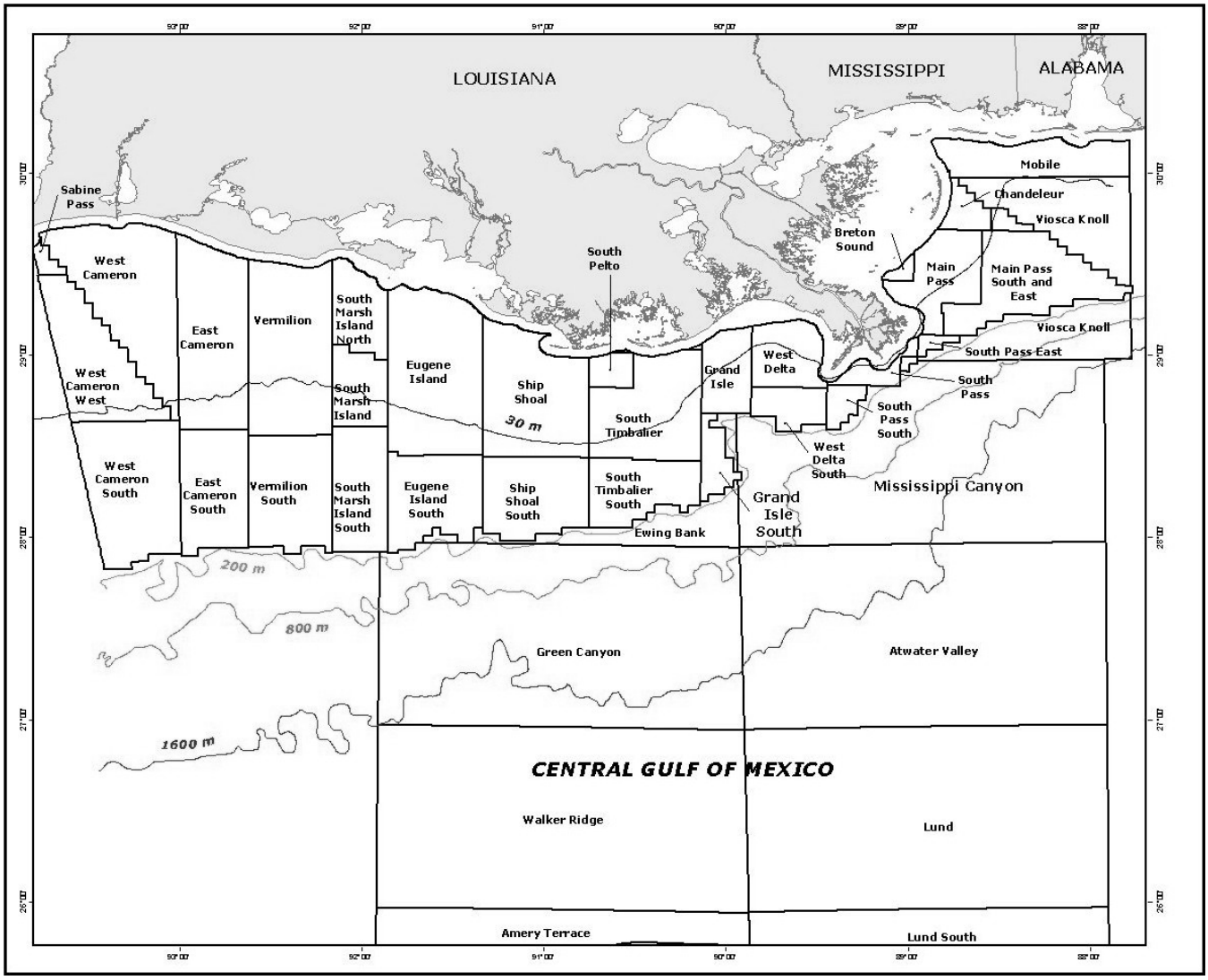
Source: Energy Information Administration, Office of Oil and Gas.

Figure H6. Western Planning Area, Gulf of Mexico Outer Continental Shelf Region



Source: Energy Information Administration, Office of Oil and Gas.

Figure H7. Central Planning Area, Gulf of Mexico Outer Continental Shelf Region



Source: Energy Information Administration, Office of Oil and Gas.

Figure H8. Eastern Planning Area, Gulf of Mexico Outer Continental Shelf Region

Source: Energy Information Administration, Office of Oil and Gas.

Appendix I

Annual Survey Forms for Domestic Oil and Gas Reserves

Figure I1. Form EIA-23, Cover Page

www.eia.doe.gov
Energy Information Administration

U.S. DEPARTMENT OF ENERGY
ENERGY INFORMATION ADMINISTRATION
Washington, DC 20585

Form Approved
OMB No. 1905-0057
Expiration Date: 12/31/06
(Revised 2003)

FORM EIA-23
ANNUAL SURVEY OF DOMESTIC OIL AND GAS RESERVES
REPORT YEAR 2005

This report is mandatory under the Federal Energy Administration Act of 1974 (Public Law 93-275). For the provisions concerning the confidentiality of information and sanction statements, see Section VII and VIII of the instructions.

Resubmission? ☐

PART I. IDENTIFICATION

Complete and return by April 1, 2006 to:

Energy Information Administration
U.S. Department of Energy
P O Box 8279
Silver Spring, MD 20907-8279
Attn: Form EIA-23
OR
Fax to: (202) 586-1076/ATTN: FORM EIA-23

Questions? Call 1-800-879-1470

Enter mailing address and EIA ID number, if not shown

EIA Identification Number: ☐☐☐☐☐☐ 0 0 0 0

Company Name:

Street or P.O Box:

City, State, Zip Code:

1. **Contact Information** *(person most knowledgeable about the reported data)*
   Contact Person: _____
   Phone Number: ( ) - Ext. _____
   Fax Number: ( ) - _____
   E-mail Address: _____

2. **Was your company an oil and gas field operator at any time during calendar year 2005?** *(See definition of an operator, page 1)*
   (1) ☐ No... *Complete only items 3 through14 below and return this page.*
   (2) ☐ Yes... *Complete rest of form.*

3. **Company Status, Name, and/or Address Change or Correction.** (Check appropriate box.)
   ☐ Name and address on mailing label are correct.
   ☐ Change company name, contact person, and/or mailing address as indicated below.
   ☐ Company was sold to or merged with company entered below.
   ☐ Company went out of business. Operations transferred to company entered below..

4. **Change Company Name, Address, and/or Contact Information to:**
   Company Name:
   Street or P. O. Box:
   City, State, Zip Code:
   Contact Person (*Please Print*):
   Phone Number: ( ) - Ext. | Fax Number: ( ) - | E-Mail Address:
   Comments:

SAMPLE

PART II. PARENT COMPANY IDENTIFICATION

5. **Is there a parent company that exercises ultimate control over your company?**
   (1) ☐ No... Answer 11 through 14.
   (2) ☐ Yes... Answer 6 through 14.

6. Parent Company Name
7. Street or P.O. Box
8. City | 9. State | 10. Zip Code

PART III. APPROVAL

11. Reviewed and approved by: (*Please Print*) | 12. Title
13. Signature | 14. Date

Title 18 USC 1001 makes it a criminal offense for any person knowingly and willingly to make to any Agency or Department of the United States any false, fictitious, or fraudulent statements as to any matter within its jurisdiction.

Source: Energy Information Administration, Offfice of Oil and Gas.

Figure I2. Form EIA-23, Summary Report – Page 1

2005

FORM EIA-23S
ANNUAL SURVEY OF DOMESTIC OIL AND GAS RESERVES
SUMMARY REPORT
PAGE 1 OF 2

Form Approved
OMB No. 1905-0057
Expiration Date: 12/31/06
(Revised 2003)

Report All Volumes of Crude Oil and Lease Condensate in Thousands of Barrels [MBbls] at 60°F
Report All Volumes of Natural Gas in Millions of Cubic Feet [MMCF] at 14.73 psia and 60°F

1.0 OPERATOR AND REPORT IDENTIFICATION DATA

1.1 OPERATOR EIA ID CODE	1.2 OPERATOR NAME	REPORT DATE	1.3 ORIGINAL	1.4 RESUBMISSION
		12 31 05		

2.0 PRODUCTION AND RESERVES DATA

STATE OR GEOGRAPHIC SUBDIVISION		CRUDE OIL			NATURAL GAS			LEASE CONDENSATE		
		RESERVES	2005 PRODUCTION		RESERVES	2005 PRODUCTION		RESERVES	2005 PRODUCTION	
		Proved Reserves Dec. 31, 2005 (MBbls) (A)	(From properties for which reserves were Estimated) (MBbls) (B)	(From properties for which reserves were Not Estimated) (MBbls) (C)	Proved Reserves Dec. 31, 2005 (MMCF) (D)	(From properties for which reserves were Estimated) (MMCF) (E)	(From properties for which reserves were Not Estimated (MMCF) (F)	Proved Reserves Dec. 31, 2005 (MBbls) (G)	(From properties for which reserves were Estimated) (MBbls) (H)	(From properties for which reserves were Not Estimated) (MBbls) (I)
ALABAMA-ONSHORE	AL									
ALABAMA-STATE OFFSHORE	AL05									
ALASKA-NORTH ONSHORE AND OFFSHORE	AK50									
ALASKA-SOUTH ONSHORE	AK10									
ALASKA-SOUTH STATE OFFSHORE	AK05									
ARIZONA	AZ									
ARKANSAS	AR									
CALIFORNIA-COASTAL REGION ONSHORE	CA50									
CALIFORNIA-LOS ANGELES BASIN ONSHORE	CA90									
CALIFORNIA-SAN JOAQUIN BASIN ONSHORE	CA10									
CALIFORNIA-STATE OFFSHORE	CA05									
COLORADO	CO									
FLORIDA-ONSHORE	FL									
FLORIDA-STATE OFFSHORE	FL05									
ILLINOIS	IL									
INDIANA	IN									
KANSAS	KS									
KENTUCKY	KY									
LOUISIANA-NORTH	LA50									
LOUISIANA-SOUTH ONSHORE	LA10									
LOUISIANA-STATE OFFSHORE	LA05									
MARYLAND	MD									
MICHIGAN	MI									
MISSISSIPPI-ONSHORE	MS									
MISSISSIPPI-STATE OFFSHORE	MS05									
MISSOURI	MO									
MONTANA	MT									
NEBRASKA	NE									
NEVADA	NV									
NEW MEXICO-EAST	NM10									
NEW MEXICO-WEST	NM50									
NEW YORK	NY									
NORTH DAKOTA	ND									
OHIO	OH									

SAMPLE

Source: Energy Information Administration, Offfice of Oil and Gas.

Figure I3. Form EIA-23, Summary Report – Page 2

2005

FORM EIA-23S
ANNUAL SURVEY OF DOMESTIC OIL AND GAS RESERVES
SUMMARY REPORT
PAGE 2 OF 2

Form Approved
OMB No. 1905-0057
Expiration Date: 12/31/06
(Revised 2003)

Report All Volumes of Crude Oil and Lease Condensate in Thousands of Barrels [MBbls] at 60°F
Report All Volumes of Natural Gas in Millions of Cubic Feet [MMCF] at 14.73 psia and 60°F

1.0 OPERATOR AND REPORT IDENTIFICATION DATA					
1.1 OPERATOR I.D. CODE	1.2 OPERATOR NAME	REPORT DATE	1.3 ORIGINAL	1.4 AMENDED	
		12 31 05			

2.0 PRODUCTION AND RESERVES DATA

STATE OR GEOGRAPHIC SUBDIVISION		CRUDE OIL			NATURAL GAS			LEASE CONDENSATE		
		RESERVES	2005 PRODUCTION		RESERVES	2005 PRODUCTION		RESERVES	2005 PRODUCTION	
		Proved Reserves Dec. 31, 2005 (MBbls) (A)	(From properties for which reserves were Estimated) (MBbls) (B)	(From properties for which reserves were Not Estimated) (MBbls) (C)	Proved Reserves Dec. 31, 2005 (MMCF) (D)	(From properties for which reserves were Estimated) (MMCF) (E)	(From properties for which reserves were Not Estimated (MMCF) (F)	Proved Reserves Dec. 31, 2005 (MBbls) (G)	(From properties for which reserves were Estimated) (MBbls) (H)	(From properties for which reserves were Not Estimated) (MBbls) (I)
OKLAHOMA	OK									
PENNSYLVANIA	PA									
SOUTH DAKOTA	SD									
TENNESSEE	TN									
TEXAS-RRC DISTRICT 1	TX10									
TEXAS-RRC DISTRICT 2 ONSHORE	TX20									
TEXAS-RRC DISTRICT 3 ONSHORE	TX30									
TEXAS-RRC DISTRICT 4 ONSHORE	TX40									
TEXAS-RRC DISTRICT 5 *	TX50									
TEXAS-RRC DISTRICT 6	TX60									
TEXAS-RRC DISTRICT 7B	TX70									
TEXAS-RRC DISTRICT 7C	TX75									
TEXAS-RRC DISTRICT 8	TX80									
TEXAS-RRC DISTRICT 8A	TX85									
TEXAS-RRC DISTRICT 9	TX90									
TEXAS-RRC DISTRICT 10	TX95									
TEXAS-STATE OFFSHORE	TX05									
UTAH	UT									
VIRGINIA	VA									
WEST VIRGINIA	WV									
WYOMING	WY									
FEDERAL OFFSHORE-GULF OF MEXICO (ALABAMA)	AL00									
FEDERAL OFFSHORE-GULF OF MEXICO (FLORIDA)	FL00									
FEDERAL OFFSHORE-GULF OF MEXICO (LOUISIANA)	LA00									
FEDERAL OFFSHORE-GULF OF MEXICO (MISSISSIPPI)	MS00									
FEDERAL OFFSHORE-GULF OF MEXICO (TEXAS)	TX00									
FEDERAL OFFSHORE-PACIFIC (ALASKA)	AK00									
FEDERAL OFFSHORE-PACIFIC (CALIFORNIA)	CA00									
FEDERAL OFFSHORE-PACIFIC (OREGON)	OR00									
OTHER STATE (SPECIFY)										
TOTAL (SUM EACH COLUMN)	US									

SAMPLE

Source: Energy Information Administration, Offfice of Oil and Gas.

Figure I4. Form EIA-23, Detail Report – Schedule A

2005

FORM EIA-23L
ANNUAL SURVEY OF DOMESTIC OIL AND GAS RESERVES
SCHEDULE A - OPERATED PROVED RESERVES, PRODUCTION, AND RELATED DATA BY FIELD
Report All Liquid Volumes in Thousands of Barrels [MBbls] at 60°F;
Report All Volumes of Natural Gas in Millions of Cubic Feet [MMCF] at 60°F and 14.73 psia

Form Approved
OMB No. 1905-0057
Expiration Date: 12/31/06
(Revised 2003)

1.0 OPERATOR AND REPORT IDENTIFICATION DATA

1.1 OPERATOR EIA ID CODE	1.2 OPERATOR NAME	REPORT DATE	1.3 ORIGINAL	1.4 AMENDED	1.5 PAGE
		12 31 05			____ OF ____

2.0 FIELD DATA (OPERATED BASIS)

2.1

1. STATE ABBR.	2. SUBDIV. CODE	3. COUNTY CODE	4. FIELD CODE	5. MMS CODE	6. FIELD NAME	7. PROVED NONPRODUCING RESERVES – DECEMBER 31, 2005				8. FOOTNOTE
						CRUDE OIL (a) (MBbls)	ASSOC-DISSOLVED (b) GAS (MMCF)	NONASSOCIATED (c) GAS (MMCF)	LEASE CON- (d) DENSATE (MBbls)	

9. WATER DEPTH	10. FIELD DISCOVERY YEAR	11. PROSPECT NAME (OPTIONAL)

TYPE OF HYDROCARBON	TOTAL PROVED RESERVES DECEMBER 31, 2004 (A)	REVISION INCREASES (B)	REVISION DECREASES (C)	SALES (D)	ACQUISITIONS (E)	EXTENSIONS (F)	NEW FIELD DISCOVERIES (G)	NEW RESERVOIRS IN OLD FIELDS (H)	CALENDAR YEAR PRODUCTION (I)	TOTAL PROVED RESERVES DECEMBER 31, 2005 (J)
12. CRUDE OIL (MBbls)										
13. ASSOCIATED-DISSOLVED GAS (MMCF)										
14. NONASSOCIATED GAS (MMCF)										
15. LEASE CONDENSATE (MBbls)										

2.2

1. STATE ABBR.	2. SUBDIV. CODE	3. COUNTY CODE	4. FIELD CODE	5. MMS CODE	6. FIELD NAME	7. PROVED NONPRODUCING RESERVES – DECEMBER 31, 2005				8. FOOTNOTE
						CRUDE OIL (a) (MBbls)	ASSOC-DISSOLVED (b) GAS (MMCF)	NONASSOCIATED (c) GAS (MMCF)	LEASE CON- (d) DENSATE (MBbls)	

9. WATER DEPTH	10. FIELD DISCOVERY YEAR	11. PROSPECT NAME (OPTIONAL)

TYPE OF HYDROCARBON	TOTAL PROVED RESERVES DECEMBER 31, 2004 (A)	REVISION INCREASES (B)	REVISION DECREASES (C)	SALES (D)	ACQUISITIONS (E)	EXTENSIONS (F)	NEW FIELD DISCOVERIES (G)	NEW RESERVOIRS IN OLD FIELDS (H)	CALENDAR YEAR PRODUCTION (I)	TOTAL PROVED RESERVES DECEMBER 31, 2005 (J)
12. CRUDE OIL (MBbls)										
13. ASSOCIATED-DISSOLVED GAS (MMCF)										
14. NONASSOCIATED GAS (MMCF)										
15. LEASE CONDENSATE (MBbls)										

SAMPLE

2.3

1. STATE ABBR.	2. SUBDIV. CODE	3. COUNTY CODE	4. FIELD CODE	5. MMS CODE	6. FIELD NAME	7. PROVED NONPRODUCING RESERVES – DECEMBER 31, 2005				8. FOOTNOTE
						CRUDE OIL (a) (MBbls)	ASSOC-DISSOLVED (b) GAS (MMCF)	NONASSOCIATED (c) GAS (MMCF)	LEASE CON- (d) DENSATE (MBbls)	

9. WATER DEPTH	10. FIELD DISCOVERY YEAR	11. PROSPECT NAME (OPTIONAL)

TYPE OF HYDROCARBON	TOTAL PROVED RESERVES DECEMBER 31, 2004 (A)	REVISION INCREASES (B)	REVISION DECREASES (C)	SALES (D)	ACQUISITIONS (E)	EXTENSIONS (F)	NEW FIELD DISCOVERIES (G)	NEW RESERVOIRS IN OLD FIELDS (H)	CALENDAR YEAR PRODUCTION (I)	TOTAL PROVED RESERVES DECEMBER 31, 2005 (J)
12. CRUDE OIL (MBbls)										
13. ASSOCIATED-DISSOLVED GAS (MMCF)										
14. NONASSOCIATED GAS (MMCF)										
15. LEASE CONDENSATE (MBbls)										

Source: Energy Information Administration, Offfice of Oil and Gas.

Figure I5. Form EIA-23, Detail Report – Schedule B

2005

FORM EIA-23L
ANNUAL SURVEY OF DOMESTIC OIL AND GAS RESERVES
SCHEDULE B – FOOTNOTES

Form Approved
OMB No. 1905-0057
Expiration Date:12/31/06
(Revised 2003)

1.1 OPERATOR EIA ID CODE	1.2 OPERATOR NAME	REPORT DATE	1.3 ORIGINAL	1.4 AMENDED	1.5 PAGE
		12 31 05			

STATE ABBR. (a)	SUBDIV. CODE (b)	COUNTY CODE (c)	FIELD CODE (d)	MMS CODE (e)	HYDRO-CARBON TYPE (f)	COLUMN (g)	FOOTNOTES (h)

SAMPLE

Source: Energy Information Administration, Offfice of Oil and Gas.

Figure I6. Form EIA-64A

www.eia.doe.gov
Energy Information Administration

U.S. DEPARTMENT OF ENERGY
ENERGY INFORMATION ADMINISTRATION
Washington, DC 20585

Form Approved
OMB No. 1905-0057
Expiration Date: 12/31/06

ANNUAL REPORT OF THE ORIGIN OF NATURAL GAS LIQUIDS PRODUCTION
FORM EIA-64A
CALENDAR YEAR 2005

This report is mandatory under Public Law 93-275. Failure to comply may result in criminal fines, civil penalties and other sanctions as provided by law. For the sanctions and the provisions concerning the confidentiality of information submitted on this form, see Page 2 of the Instructions.

Complete and return by April 1, 2005 to:

Energy Information Administration
P O Box 8279
Silver Spring, MD 20907-8279
Attn: EIA-64A
OR
Fax to (202) 586-1076 (Attn: EIA-64A)

Questions ?: Call 1-800-879-1470

Affix Mailing Label

PART I. PLANT AND PRODUCTION REPORT IDENTIFICATION

1.0 Does this report reflect active natural gas processing at the facility for the entire year? ☐ Yes ☐ No (indicate number of months below)

Months covered by this report _____ through _____, 2005 (Include Explanatory Notes in Section 7.0)

2.0 Submission Status ☐ Original ☐ Amended

3.0 Label Information **(If label is incorrect or information is missing or no label is given, enter correct information below).**

3.1 Parent Company's Name

3.2 Operator's Name

3.3 Plant Name

3.4 Geographic Location (Use Area of Origin Codes, Page 6) ☐☐☐☐

3.5 Operator's Street Address/PO Box

3.6 City | 3.7 State | 3.8 Zip Code

3.9 Contact Name | 3.10 Title | 3.11 Date

3.12 Telephone Number ( ) Ext | 3.13 Fax Number ( ) | 3.14 E-mail Address:

PART II. ORIGIN OF NATURAL GAS RECEIVED AND NATURAL GAS LIQUIDS PRODUCED

Line	Area of Origin Code (A)	Natural Gas Received Report in millions of cubic feet (MMCF) (B)	Natural Gas Liquids Production Report in thousands of barrels (MBbl) (C)
4.1			
4.2			
4.3			
4.4			
4.5			
4.6			
4.7			
4.8	TOTAL		

5.0 Gas Shrinkage Resulting from Natural Gas Liquids Extracted (MMCF):

6.0 Natural Gas Used as Fuel in Processing (MMCF):

7.0 Explanatory Notes:

Title 18 USC 1001 makes it a criminal offense for any person knowingly and willingly to make to any Agency or Department of the United States any false, fictitious, or fraudulent statements as to any matter within its jurisdiction.

SAMPLE

Source: Energy Information Administration, Offfice of Oil and Gas.

Glossary

Glossary

This glossary contains definitions of the technical terms used in this report and employed by respondents in completing Form EIA--23, "Annual Survey of Domestic Oil and Gas Reserves," or Form EIA--64A, "Annual Report of the Origin of Natural Gas Liquids Production," for the report year 2001.

Acquisitions: The volume of proved reserves gained by the purchase of an existing fields or properties, from the date of purchase or transfer.

Adjustments: The quantity which preserves an exact annual reserves balance within each State or State subdivision of the following form:

Published Proved Reserves at End of Previous Report Year
+ Adjustments
+ Revision Increases
− Revision Decreases
− Sales
+ Acquisitions
+ Extensions
+ New Field Discoveries
+ New Reservoir Discoveries in Old Fields
− Report Year Production
= Published Proved Reserves at End of Report Year

These adjustments are the yearly changes in the published reserve estimates that cannot be attributed to the estimates for other reserve change categories because of the survey and statistical estimation methods employed. For example, variations as a result of changes in the operator frame, different random samples or imputations for missing or unreported reserve changes, could contribute to adjustments.

Affiliated (**Associated**) **Company:** An "affiliate" of, or a person "affiliated" with, a specific person is a person that directly, or indirectly through one or more intermediaries: controls; or is controlled by; or is under common control with, the person specified. (See **Person and Control**)

Control: The term "control" (including the terms "controlling," "controlled by," and "under common control with") means the possession, direct or indirect, of the power to direct or cause the direction of the management and policies of a person, whether through the ownership of voting shares, by contract, or otherwise. (See **Person**)

Corrections: (See **Revisions**)

Crude Oil: A mixture of hydrocarbons that exists in the liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. Crude oil may also include:

1. Small amounts of hydrocarbons that exist in the gaseous phase in natural underground reservoirs but are liquid at atmospheric pressure after being recovered from oil well (casinghead) gas in lease separators, and that subsequently are comingled with the crude stream without being separately measured
2. Small amounts of nonhydrocarbons produced with the oil.

When a State regulatory agency specifies a definition of crude oil which differs from that set forth above, the State definition is to be followed and its use footnoted on Schedule B of Form EIA--23.

Extensions: The reserves credited to a reservoir because of enlargement of its proved area. Normally the ultimate size of newly discovered fields, or newly discovered reservoirs in old fields, is determined by wells drilled in years subsequent to discovery. When such wells add to the proved area of a previously discovered reservoir, the increase in proved reserves is classified as an extension.

Field: An area consisting of a single reservoir or multiple reservoirs all grouped on, or related to, the same individual geological structural feature and/or stratigraphic condition. There may be two or more reservoirs in a field that are separated vertically by intervening impervious strata, or laterally by local geologic barriers, or by both.

Field Area: A geographic area encompassing two or more pools that have a common gathering and metering system, the reserves of which are reported as a single unit. This concept applies primarily to the Appalachian region. (See **Pool**)

Field Discovery Year: The calendar year in which a field was first recognized as containing economically recoverable accumulations of oil and/or gas.

Field Separation Facility: A surface installation designed to recover lease condensate from a produced natural gas stream frequently originating from more than one lease, and managed by the operator of one or more of these leases. (See **Lease Condensate**)

Gross Working Interest Ownership Basis: Gross working interest ownership is the respondent's working interest in a given property plus the proportionate share of any royalty interest, including overriding royalty interest, associated with the working interest. (See **Working Interest** and **Royalty** (including **Overriding Royalty**) **Interest**)

Lease Condensate: A mixture consisting primarily of pentanes and heavier hydrocarbons which is recovered as a liquid from natural gas in lease or field separation facilities, exclusive of products recovered at natural gas processing plants or facilities.

Lease Separator: A lease separator is a facility installed at the surface for the purpose of (a) separating gases from produced crude oil and water at the temperature and pressure conditions of the separator, and/or (b) separating gases from that portion of the produced natural gas stream which liquefies at the temperature and pressure conditions of the separator.

Natural Gas: A mixture of hydrocarbon compounds and small quantities of various nonhydrocarbons existing in the gaseous phase or in solution with crude oil in natural underground reservoirs at reservoir conditions. The principal hydrocarbons normally contained in the mixture are methane, ethane, propane, butane, and pentanes. Typical nonhydrocarbon gases which may be present in reservoir natural gas are water vapor, carbon dioxide, helium, hydrogen sulfide, and nitrogen. Under reservoir conditions, natural gas and the liquefiable portions occur either in a single gaseous phase in the reservoir or in solution with crude oil, and are not distinguishable at the time as separate substances. (See **Natural Gas, Associated--Dissolved** and **Natural Gas, Nonassociated**)

Natural Gas, Associated--Dissolved: The combined volume of natural gas which occurs in crude oil reservoirs either as free gas (associated) or as gas in solution with crude oil (dissolved).

Natural Gas, "Dry": The actual or calculated volumes of natural gas which remain after:

1. The liquefiable hydrocarbon portion has been removed from the gas stream (i.e., gas after lease, field, and/or plant separation)
2. Any volumes of nonhydrocarbon gases have been removed where they occur in sufficient quantity to render the gas unmarketable.

Natural Gas, Nonassociated: Natural gas not in contact with significant quantities of crude oil in a reservoir.

Natural Gas Liquids: Those hydrocarbons in natural gas which are separated from the gas through the processes of absorption, condensation, adsorption, or other methods in gas processing or cycling plants. Generally such liquids consist of propane and heavier hydrocarbons and are commonly referred to as condensate, natural gasoline, or liquefied petroleum gases. Where hydrocarbon components lighter than propane are recovered as liquids, these components are included with natural gas liquids.

Natural Gas Processing Plant: A facility designed to recover natural gas liquids from a stream of natural gas which may or may not have passed through lease separators and/or field separation facilities. Another function of the facility is to control the quality of the processed natural gas stream. Cycling plants are considered natural gas processing plants.

Natural Gas, Wet After Lease Separation: The volume of natural gas remaining after removal of lease condensate in lease and/or field separation facilities, if any, and after exclusion of nonhydrocarbon gases where they occur in sufficient quantity to render the gas unmarketable. Natural gas liquids may be recovered from volumes of natural gas, wet after lease separation, at natural gas processing plants. (See **Lease Condensate, Lease Separator,** and **Field Separation Facility**)

Net Revisions: (See **Revisions**)

New Field: A field discovered during the report year.

New Field Discoveries: The volumes of proved reserves of crude oil, natural gas and/or natural gas

liquids discovered in new fields during the report year.

New Reservoir: A reservoir discovered during the report year.

New Reservoir Discoveries in Old Fields: The volumes of proved reserves of crude oil, natural gas, and/or natural gas liquids discovered during the report year in new reservoir(s) located in old fields.

Nonproducing Reserves: Quantities of proved liquid or gaseous hydrocarbon reserves that have been identified, but which did not produce during the last calendar year regardless of the availability and/or operation of production, gathering or transportation facilities. This includes both proved undeveloped and proved developed non-producing reserves.

Old Field: A field discovered prior to the report year.

Old Reservoir: A reservoir discovered prior to the report year.

Operator, Gas Plant: The person responsible for the management and day--to--day operation of one or more natural gas processing plants as of December 31 of the report year. The operator is generally a working interest owner or a company under contract to the working interest owner(s). Plants shut down during the report year are also to be considered "operated" as of December 31. (See **Person**)

Operator, Oil and/or Gas Well: The person responsible for the management and day--to--day operation of one or more crude oil and/or natural gas wells as of December 31 of the report year. The operator is generally a working interest owner or a company under contract to the working interest owner(s). Wells included are those which have proved reserves of crude oil, natural gas, and/or lease condensate in the reservoirs associated with them, whether or not they are producing. Wells abandoned during the report year are also to be considered "operated" as of December 31. (See **Person**, **Proved Reserves of Crude Oil**, **Proved Reserves of Natural Gas**, **Proved Reserves of Lease Condensate**, **Report Year**, and **Reservoir**)

Ownership: (See **Gross Working Interest Ownership Basis**)

Parent Company: The parent company of a business entity is an affiliated company which exercises ultimate control over that entity, either directly or indirectly through one or more intermediaries. (See **Affiliated** (**Associated**) **Company and Control**)

Person: An individual, a corporation, a partnership, an association, a joint--stock company, a business trust, or an unincorporated organization.

Pool: In general, a reservoir. In certain situations a pool may consist of more than one reservoir. (See **Field Area**)

Plant Liquids: Those volumes of natural gas liquids recovered in natural gas processing plants.

Production, Crude Oil: The volumes of crude oil which are extracted from oil reservoirs during the report year. These volumes are determined through measurement of the volumes delivered from lease storage tanks, (i.e., at the point of custody transfer) with adjustment for (1) net differences between opening and closing lease inventories, and for (2) basic sediment and water. Oil used on the lease is considered production.

Production, Lease Condensate: The volume of lease condensate produced during the report year. Lease condensate volumes include only those volumes recovered from lease or field separation facilities. (See **Lease Condensate**)

Production, Natural Gas, Dry: The volume of natural gas withdrawn from reservoirs during the report year less (1) the volume returned to such reservoirs in cycling, repressuring of oil reservoirs and conservation operations; less (2) shrinkage resulting from the removal of lease condensate and plant liquids; and less (3) nonhydrocarbon gases where they occur in sufficient quantity to render the gas unmarketable. Volumes of gas withdrawn from gas storage reservoirs and native gas, which has been transferred to the storage category, are not considered production. This is not the same as marketed production, since the latter also excludes vented and flared gas, but contains plant liquids.

Production, Natural Gas, Wet after Lease Separation: The volume of natural gas withdrawn from reservoirs during the report year less (1) the volume returned to such reservoirs in cycling, repressuring of oil reservoirs and conservation operations; less (2) shrinkage resulting from the

removal of lease condensate; and less (3) nonhydrocarbon gases where they occur in sufficient quantity to render the gas unmarketable. Volumes of gas withdrawn from gas storage reservoirs and native gas, which has been transferred to the storage category, are not considered production. This is not the same as marketed production, since the latter excludes vented and flared gas.

Production, Natural Gas Liquids: The volume of natural gas liquids removed from natural gas in lease separators, field facilities, gas processing plants or cycling plants during the report year.

Production, Plant Liquids: The volume of liquids removed from natural gas in natural gas processing plants or cycling plants during the report year.

Proved Reserves of Crude Oil: Proved reserves of crude oil as of December 31 of the report year are the estimated quantities of all liquids defined as crude oil, which geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

Reservoirs are considered proved if economic producibility is supported by actual production or conclusive formation test (drill stem or wire line), or if economic producibility is supported by core analyses and/or electric or other log interpretations. The area of an oil reservoir considered proved includes (1) that portion delineated by drilling and defined by gas--oil and/or oil--water contacts, if any; and (2) the immediately adjoining portions not yet drilled, but which can be reasonably judged as economically productive on the basis of available geological and engineering data. In the absence of information on fluid contacts, the lowest known structural occurrence of hydrocarbons is considered to be the lower proved limit of the reservoir.

Volumes of crude oil placed in underground storage are not to be considered proved reserves.

Reserves of crude oil which can be produced economically through application of improved recovery techniques (such as fluid injection) are included in the "proved" classification when successful testing by a pilot project, or the operation of an installed program in the reservoir, provides support for the engineering analysis on which the project or program was based.

Estimates of proved crude oil reserves do not include the following: (1) oil that may become available from known reservoirs but is reported separately as "indicated additional reserves"; (2) natural gas liquids (including lease condensate); (3) oil, the recovery of which is subject to reasonable doubt because of uncertainty as to geology, reservoir characteristics, or economic factors; (4) oil that may occur in undrilled prospects; and (5) oil that may be recovered from oil shales, coal, gilsonite, and other such sources. It is not necessary that production, gathering or transportation facilities be installed or operative for a reservoir to be considered proved.

Proved Reserves of Lease Condensate: Proved reserves of lease condensate as of December 31 of the report year are the volumes of lease condensate expected to be recovered in future years in conjunction with the production of proved reserves of natural gas as of December 31 of the report year, based on the recovery efficiency of lease and/or field separation facilities installed as of December 31 of the report year. (See **Lease Condensate** and **Proved Reserves of Natural Gas**)

Proved Reserves of Natural Gas: Proved reserves of natural gas as of December 31 of the report year are the estimated quantities which analysis of geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

Reservoirs are considered proved if economic producibility is supported by actual production or conclusive formation test (drill stem or wire line), or if economic producibility is supported by core analyses and/or electric or other log interpretations.

The area of a gas reservoir considered proved includes: (1) that portion delineated by drilling and defined by gas--oil and/or gas--water contacts, if any; and (2) the immediately adjoining portions not yet drilled, but which can be reasonably judged as economically productive on the basis of available geological and engineering data. In the absence of information on fluid contacts, the lowest known structural occurrence of hydrocarbons is considered to be the lower proved limit of the reservoir.

Volumes of natural gas placed in underground storage are not to be considered proved reserves.

For natural gas, wet after lease separation, an appropriate reduction in the reservoir gas volume has been made to cover the removal of the liquefiable portions of the gas in lease and/or field separation facilities and the exclusion of

nonhydrocarbon gases where they occur in sufficient quantity to render the gas unmarketable.

For dry natural gas, an appropriate reduction in the gas volume has been made to cover the removal of the liquefiable portions of the gas in lease and/or field separation facilities, and in natural gas processing plants, and the exclusion of nonhydrocarbon gases where they occur in sufficient quantity to render the gas unmarketable.

It is not necessary that production, gathering, or transportation facilities be installed or operative for a reservoir to be considered proved. It is to be assumed that compression will be initiated if and when economically justified.

Proved Reserves of Natural Gas Liquids: Proved reserves of natural gas liquids as of December 31 of the report year are those volumes of natural gas liquids (including lease condensate) demonstrated with reasonable certainty to be separable in the future from proved natural gas reserves, under existing economic and operating conditions.

Proved Ultimate Recovery: The sum of proved reserves and cumulative production at a specified point in time. It measures the maximum recoverable volume *known* at that time and is a dynamic quantity that is expected to change over time for any field, group of fields, State, or Country. In most instances, therefore, an estimate of Proved Ultimate Recovery does not represent the all-time maximum recoverable volume of resources for a given field or area.

Also, the proved ultimate recovery of a field, a group of fields, a State, or a Country grows (appreciates) over time in most instances.

Report Year: The calendar year to which data reported in this publication pertain.

Reserves: (See **Proved Reserves**)

Reserve Additions: Consist of adjustments, net revisions, extensions to old reservoirs, new reservoir discoveries in old fields, and new field discoveries.

Reserves Changes: Positive and negative revisions, extensions, new reservoir discoveries in old fields, and new field discoveries, which occurred during the report year.

Reservoir: A porous and permeable underground formation containing an individual and separate natural accumulation of producible hydrocarbons (oil and/or gas) which is confined by impermeable rock or water barriers and is characterized by a single natural pressure system.

Revisions: Changes to prior year--end proved reserves estimates, either positive or negative, resulting from new information other than an increase in proved acreage (extension). Revisions include increases of proved reserves associated with the installation of improved recovery techniques or equipment. They also include correction of prior report year arithmetical or clerical errors and adjustments to prior year--end production volumes to the extent that these alter reported prior year reserves estimates.

Royalty (Including Overriding Royalty) Interests: These interests entitle their owner(s) to a share of the mineral production from a property or to a share of the proceeds therefrom. They do not contain the rights and obligations of operating the property, and normally do not bear any of the costs of exploration, development, and operation of the property.

Sales: The volume of proved reserves deducted from an operator's total reserves when selling an existing field or property, during the calendar year.

Subdivision: A prescribed portion of a given State or other geographical region defined in this publication for statistical reporting purposes.

Subsidiary Company: A company which is controlled through the ownership of voting stock, or a corporate joint venture in which a corporation is owned by a small group of businesses as a separate and specific business or project for the mutual benefit of the members of the group. (See **Control**)

Total Discoveries: The sum of extensions, new reservoir discoveries in old fields, and new field discoveries, which occurred during the report year.

Total Liquid Hydrocarbon Reserves: The sum of crude oil and natural gas liquids reserves volumes.

Total Operated Basis: The total reserves or production associated with the wells operated by an individual operator. This is also commonly known as the "gross operated" or "8/8ths" basis.

Working Interest: A working interest permits the owner(s) to explore, develop and operate a property. The working interest owner(s) bear(s) the costs of exploration, development and operation of the property, and in return is (are) entitled to a share of the mineral production from the property or to a share of the proceeds therefrom.