

An offshore oil rig is shown in the center of the image, extending from the ocean surface down into the water. The rig is a complex structure of metal platforms, ladders, and pipes. A yellow helicopter is flying in the sky above the rig. The sky is blue with some white clouds. The water is a deep blue. The entire image is framed by a light blue border.

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U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 2001 Annual Report

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Preface

The *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 2001 Annual Report* is the 25th 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, 2001, as well as production volumes for the United States and selected States and State subdivisions for the year 2001. 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 indicated additional crude oil reserves and crude oil, natural gas, and lease condensate reserves in nonproducing reservoirs. A discussion of notable oil and gas exploration and development activities during 2001 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 2001; 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).

Authors were John H. Wood, Steven G. Grape, Rafi Zeinalpour, and Rhonda S. Green. Technical contributions were made by Jack Perrin, Dewayne Cravens, Paul Chapman, and Gwen Cox. Technical editing was provided by David F. Morehouse.

Address questions on specific sections of the publication to the following analyst/author:

- Executive Summary and Appendices F and G
John H. Wood
Phone: 214-720-6160
E-mail: jwood@eia.doe.gov
Fax: 214-720-6155
- Chapters 1, 2, 3, 4, 5
Steven G. Grape
Phone: 214-720-6174
E-mail: sgrape@eia.doe.gov
Fax: 214-720-6155
- Appendices A, B, C, D, E, H, and I
Rhonda S. Green
Phone: 214-720-6161
E-mail: rgreen@eia.doe.gov
Fax: 214-720-6155
- Field-level Reserves Quality Assurance
Rafi M. Zeinalpour
Phone: 214-720-6191
E-mail: rzeinalp@eia.doe.gov
Fax: 214-720-6155

COVER PHOTO:

We would like to thank Ocean Energy, Incorporated of Houston, Texas for permission to print an illustration of Ocean's Nansen Truss Spar, the first of its kind installed in the world. Construction of the Nansen Truss Spar platform was completed in 4th quarter of 2001 in the deep water of the East Breaks region of the Gulf of Mexico. A second Truss Spar platform was installed at Ocean's Boomvang Field, also in the East Breaks region. Combined, these platforms have a production capacity of up to 80,000 barrels of oil and 400 million cubic feet of gas.

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Executive Summary: U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 2001 Annual Report

U.S. crude oil and natural gas proved reserves increased in 2001, replacing production by substantial margins. One new deepwater field accounted for a significant portion of all new oil reserves. Thunder Horse Field is located in Mississippi Canyon Blocks 776, 777, and 778, 125 miles south-east of New Orleans at a water depth of 6,000 feet. After full development, Thunder Horse is expected to be the largest field in the Gulf of Mexico. Developing this field in water over a mile deep will be another technical achievement in the Federal Offshore.

As of December 31, 2001 proved reserves were:

Crude Oil (million barrels)	
2000	22,045
2001	22,446
Increase	1.8%
Dry Natural Gas (billion cubic feet)	
2000	177,427
2001	183,460
Increase	3.4%
Natural Gas Liquids (million barrels)	
2000	8,345
2001	7,993
Decrease	-4.2%

U.S. crude oil proved reserves increased by almost 2 percent. Reserves additions in 2001 were 121 percent of domestic oil production. From 1977 through 1996, proved reserves of crude oil declined 17 out of 19 years. In striking contrast, they increased 4 out of the last 5 years. New field discoveries of oil in 2001 were at the highest level since Alaska's Prudhoe Bay Field was booked in the 1970s. The majority of crude oil proved reserves additions came from the deepwater Gulf of Mexico Federal Offshore and Alaska, both of which are frontier areas.

The majority of natural gas proved reserves additions were in Wyoming, Colorado, and Texas. Significant reserves were added in the Powder River Basin coalbed methane fields and the Pinedale Field in Wyoming, the Lobo Trend and Barnett Shale gas

fields in Texas, and the Wattenberg Field and the coalbed methane fields in Colorado.

Natural gas liquids reserves decreased in 2001. Usually, when gas reserves increase, the natural gas liquids associated with that gas also increase. However, coalbed methane was a large portion of the new gas reserves in 2001, and coalbed methane has effectively no natural gas liquids content. As a result, reserves of natural gas liquids declined in 2001 when production outpaced reserves additions in conventional gas reservoirs.

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. This report of 2001 U.S. proved reserves of crude oil, natural gas, and natural gas liquids is the 25th in an annual series prepared by the Energy Information Administration.

Crude Oil

Total discoveries of crude oil in 2001 resulted mainly from exploration in the deepwater Gulf of Mexico Federal Offshore and on the Alaskan North Slope.

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 2,565 million barrels in 2001, almost twice the year 2000 discoveries and greater than three times the prior 10-year average.

The majority of crude oil total discoveries in 2001 were new field discoveries, particularly in the Gulf of Mexico Federal Offshore and Alaska. Operators discovered 1,407 million barrels in new fields in 2001 -- four times as much as in 2000 and over six times as much as the prior 10-year average.

Extensions to existing fields accounted for 866 million barrels of crude oil reserves additions. This was a 13 percent increase over 2000 extensions, and almost twice as much as the prior 10-year average.

New reservoir discoveries in old fields were 292 million barrels, 17 percent more than in 2000 and 93 percent more than the prior 10-year average.

Reserves additions are the sum of total discoveries, revisions and adjustments, and sales and acquisitions. The net of revisions and adjustments was a very small component of crude oil reserves additions in 2001 (-162 million barrels). In past years, net revisions and adjustments have been as much as 54 percent of annual crude oil reserves additions.

The sales component of the crude oil reserves changes (529 million barrels) was less than the revision decreases component in 2001 and acquisitions (442 million barrels) were less than revision increases. The net of sales and acquisitions of crude oil proved reserves was -87 million barrels.

Other 2001 crude oil events of note:

- The annual average domestic first purchase price for crude oil decreased 18 percent from the 2000 level to \$21.84 per barrel.
- Exploratory and developmental oil completions were up 8 percent from 2000.
- In May 2000, BP Amoco contracted Mustang Engineering to provide preliminary front-end engineering/design services for topside facilities to produce Thunder Horse Field. It will be developed in a phased approach. Initial production is expected by 2005 from a floating production facility that will be capable of producing 250,000 barrels of oil per day.

Natural Gas

Operators added 3.4 percent to proved reserves of dry natural gas in 2001. Reserves additions were 131 percent of domestic dry natural gas production. U.S. natural gas proved reserves have increased in seven of the last eight years. Most of the reserve increases were in Texas, Wyoming, and Colorado. The Gulf of Mexico and New Mexico had a slight increase, and Oklahoma had a slight decrease.

U.S. total discoveries of dry gas reserves were 22,758 billion cubic feet in 2001. This was 96 percent more than the prior 10-year average and 19 percent more than in 2000.

New field discoveries were 3,578 billion cubic feet, 80 percent more than the volume discovered in 2000 and 140 percent more than the prior 10-year average. Field extensions were 16,380 billion cubic feet, 11 percent more than extensions in 2000 and also more

than twice the prior 10-year average of 7,802 billion cubic feet.

New reservoir discoveries in old fields were 2,800 billion cubic feet, up 18 percent from 2000 and 20 percent more than the prior 10-year average.

Natural gas net revisions and adjustments were 424 billion cubic feet. The net of sales and acquisitions of dry natural gas proved reserves was 2,630 billion cubic feet.

Coalbed methane proved reserves and production continued to grow in 2001. Coalbed methane accounted for 9.6 percent of proved dry gas reserves and 7.9 percent of dry gas production.

Other 2001 natural gas events of note:

- Natural gas prices were up 12 percent in 2001 to an average of \$4.12 per thousand cubic feet (MCF) at the wellhead, as compared to \$3.69 per MCF in 2000. However, the prices started high in January 2001 (\$8.06 per MCF) and declined to an annual low of \$2.38 per MCF in December.
- Exploratory gas well completions increased 54 percent in 2001 and development well drilling was up 39 percent. Operators drilled 25 percent more wells for gas in 2001 than in 2000.
- U.S. gas production increased by 2 percent in 2001 to the highest level since 1977, the year EIA initiated its proved reserves report series.

Natural Gas Liquids

U.S. natural gas liquids proved reserves decreased 4.2 percent to 7,993 million barrels in 2001. Natural gas liquids reserves are the sum of natural gas plant liquids and lease condensate reserves.

Total proved reserves of liquid hydrocarbons (crude oil plus natural gas liquids) were 30,439 million barrels in 2001, a slight increase from the 2000 level. Natural gas liquids represented 26 percent of total liquid hydrocarbon proved reserves in 2001.

Data

These estimates are based upon analysis of data from Form EIA-23, Annual Survey of Domestic Oil and Gas Reserves, filed by 1,439 operators of oil and gas wells, and Form EIA-64A, Annual Report of the Origin of Natural Gas Liquids Production, filed by operators of 525 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.