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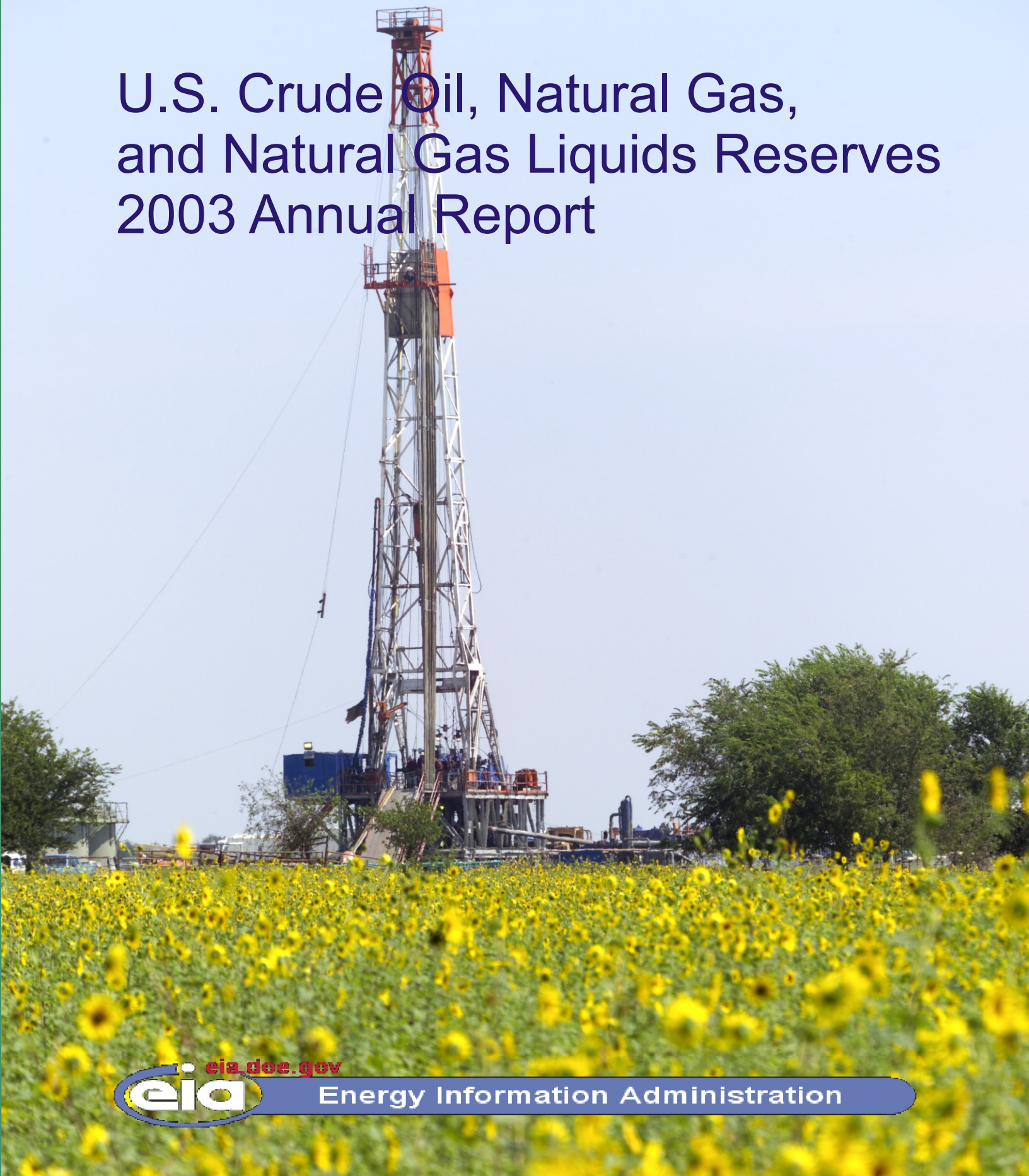
U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 2003 Annual Report



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Energy Information Administration
Office of Oil and Gas
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Preface

The *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 2003 Annual Report* is the 27th 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, 2003, as well as production volumes for the United States and selected States and State subdivisions for the year 2003. 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 2003 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 2003; 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:

Gas drilling operations in the Newark East Field in the Barnett Shale, courtesy of Devon Energy Corporation. Devon Energy Corporation, headquartered in Oklahoma City, is the largest producer in the Newark East Field in the Barnett Shale. The Barnett has become the 6th largest gas field in the United States, located in the Fort Worth area.

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Executive Summary: U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 2003 Annual Report

Proved reserves of natural gas increased for the fifth year in a row as U.S. natural gas reserves increased by 1 percent in 2003. The majority of natural gas total discoveries were from extensions of existing conventional and unconventional gas fields. Reserves additions replaced 111 percent of 2003 gas production. Natural gas proved reserves have increased in nine of the past ten years. U.S. gas production remained almost level in 2003 as declines in the Gulf of Mexico and New Mexico were offset by production increases in the Rocky Mountain States and Texas.

As of December 31, 2003 proved reserves were:

Crude Oil (million barrels)	
2002	22,677
2003	21,891
Decrease	-3.5%
Dry Natural Gas (billion cubic feet)	
2002	186,946
2003	189,044
Increase	+1.1%
Natural Gas Liquids (million barrels)	
2002	7,994
2003	7,459
Decrease	-6.7%

Crude oil proved reserves declined 3 percent in 2003, the first decline in five years. Operators only replaced 58 percent of oil production with reserves additions. Total discoveries, that included significant new field discoveries in the Gulf of Mexico Federal Offshore, were larger than average. However, proved reserves in several fields were lowered substantially because of poor well performance accompanied by engineering reassessments. The net of revisions, adjustments, sales, and acquisitions was a negative 141 million barrels in 2003 compared to a more typical positive 1,160 million barrels in 2002.

The Rocky Mountain States and Texas saw large gas reserves additions in 2003. These were driven by continuing development of unconventional gas fields, i.e., fields developed in tight sands, shales, and coalbeds. Significant reserves were added in the Powder River basin (coalbed methane) and Green River basin (deep and tight sand) in Wyoming, and in the Wattenberg Field (tight sand) and San Juan basin (coalbed methane) in Colorado and New Mexico. Significant reserves were also added in Texas' Newark East Field (Barnett Shale) which is the Nation's sixth largest natural gas field.

Coalbed methane reserves increased 1 percent from 2002 and accounted for 10 percent of U.S. dry gas proved reserves. Coalbed methane production declined very slightly in 2003 (less than 1 percent) and accounted for 8 percent of U.S. dry gas production.

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 2003 U.S. proved reserves of crude oil, natural gas, and natural gas liquids is the 27th in an annual series prepared by the Energy Information Administration.

Crude Oil

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 1,232 million barrels in 2003, 16 percent more than the prior 10-year average and 30 percent more than 2002's discoveries of 946 million barrels.

The majority of crude oil total discoveries in 2003 were new field discoveries in the Gulf of Mexico Federal Offshore. The north slope of Alaska (normally a major contributor to total discoveries) had no significant impact on the Nation's total discoveries in 2003.

New field discoveries accounted for 705 million barrels of crude oil reserves additions. Almost all were in the Gulf of Mexico Federal Offshore (702 of 705 million). This was more than double the new

field discoveries of 2002 and 84 percent more than the prior 10-year average.

Operators discovered 426 million barrels in extensions in 2003, 13 percent less than in 2002 and 14 percent less than the prior 10-year average.

New reservoir discoveries in old fields were 101 million barrels, 34 percent less than in 2002 and 43 percent less than the prior 10-year average.

Reserves additions are the sum of total discoveries, revisions, adjustments, sales, and acquisitions. In 2003, reserve additions were 1,091 million barrels which is 48 percent less than the volume of reserves additions in 2002.

Crude oil net revisions and adjustments were 257 million barrels, which is 77 percent less than the net revisions and adjustments of 2002. The net of sales and acquisitions of crude oil proved reserves was -398 million barrels.

Other 2003 crude oil events of note:

- The annual average domestic first purchase price for crude oil increased 22 percent from the 2002 level to $27.56 per barrel.
- Exploratory and developmental oil completions were up 4 percent from 2002.

Natural Gas

Total discoveries of dry gas reserves were 19,286 billion cubic feet in 2003. This was 36 percent more than the prior 10-year average and 8 percent more than in 2002. The majority of natural gas total discoveries in 2003 were from extensions of existing conventional and unconventional gas fields.

Field extensions were 16,454 billion cubic feet, 11 percent more than extensions in 2002 and 66 percent more than the prior 10-year average of 9,941 billion cubic feet.

New field discoveries were 1,222 billion cubic feet, 8 percent less than the volume discovered in 2002 and 33 percent less than the prior 10-year average.

New reservoir discoveries in old fields were 1,610 billion cubic feet, down 5 percent from 2002 and 34 percent less than the prior 10-year average.

Natural gas net revisions and adjustments were 1,203 billion cubic feet, which is 74 percent less than the net revisions and adjustments of 2002. The net of sales and acquisitions of dry natural gas proved reserves was 1,034 billion cubic feet.

Coalbed methane proved reserves grew in 2003, while production declined slightly. Coalbed methane proved reserves were 18,743 billion cubic feet, an increase of 1 percent from 2002 and accounted for 10 percent of U.S. dry gas proved reserves. Coalbed methane production was 1,600 billion cubic feet, a decrease of less than 1 percent from 2002 and accounted for 8 percent of U.S. dry gas production.

Other 2003 natural gas events of note:

- Natural gas prices were up 69 percent in 2003 to an average of $4.98 per thousand cubic feet at the wellhead, as compared to $2.95 per thousand cubic feet in 2002.
- Exploratory and developmental gas completions were up 22 percent from 2002.
- U.S. gas production increased slightly (less than 1 percent) in 2003.

Natural Gas Liquids

U.S. natural gas liquids proved reserves declined 7 percent in 2003 to 7,459 million barrels. This resulted from changes in the relative economics of natural gas and natural gas liquids, and in the liquids content of the gas production. 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 29,350 million barrels in 2003, a 4 percent decrease from the 2002 level. Natural gas liquids represented 25 percent of total liquid hydrocarbon proved reserves in 2003.

Data

These estimates are based upon analysis of data from Form EIA-23, Annual Survey of Domestic Oil and Gas Reserves, filed by 1,554 operators of oil and gas wells, and Form EIA-64A, Annual Report of the Origin of Natural Gas Liquids Production, filed by operators of 507 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.