

# 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 2006. 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 natural 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-23L 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 on Form EIA-23S. 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 estimates from 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.

### New Form EIA-23L Element: Type Code

For the 2006 survey, a new Form EIA-23L data element called *Type Code* replaced the underutilized *MMS Code*. The *Type Code* is used to categorize proved reserves and production from a field as either *Conventional (C)* or one of four types of *Unconventional* reservoirs: *Coal Bed (CB)*; *Chalk (CH)*; *Shale (SH)*; or *other Low Permeability (LP)* reservoirs (permeability of 0.1 millidarcy or less).

*Type Code* was added because the importance of unconventional resources of natural gas and crude oil to domestic energy supply continues to increase.

### 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 13,820 probable active operators and the Form EIA-64A plant frame contained 491 probable active natural gas processing plants in the United States when the 2006 surveys were initiated.

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

The 2006 survey sample consisted of 1,355 operators. EIA sampled 872 operators with certainty; 173 Category I operators, 467 Category II operators, and 232 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 483 Noncertainty operators as a systematic random sample of the remaining operators. There were 11 Successor operators in 2006. Fifty-eight (58) of the 1,355 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.

EIA mailed EIA-64A forms to all known natural gas processing plant operators as of February 1, 2006. Response rate was 100 percent from the operators surveyed (see Table E5 in Appendix E).

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 2006, the Form EIA-23 National production estimates were 1.5 percent lower than the comparable *Petroleum Supply Annual (PSA) 2006* volumes for crude oil and lease condensate combined, and were less than 1 percent higher than the comparable *Natural Gas Monthly, October 2007* volume for 2006 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.