

OIL AND GAS RESERVE GUIDELINES

Mike Zak 戴少武 郭齐军 著

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Introduction

This is being written to compile what has been published and discussed concerning reserve reporting and to compare the various standards used to define and quantify oil and gas reserves. In light of recent developments and reserve write-downs, much of the emphasis of this paper will be on the United States Security and Exchange Commission (SEC) reserve definitions and how they apply to reserve reporting. It will also discuss the People's Republic of China (P.R.C.) reserve definitions, both the old and the recently published standards, the SEC definitions; again both the old and the December 31, 2008 revised SEC guidelines, and the SPE/WPC/AAPG/SPEE Petroleum Resources Management System (PRMS). This paper will not be all encompassing, nor will it necessarily give the same information as the SEC may give at some time in the future.

The Sarbanes-Oxley Act (SOX) is also applicable to the reserve evaluation process. Reserves are a major part of an oil and gas company's value, and so will be under more surveillance than prior to SOX. The added emphasis by SOX on transparency and the liabilities imposed on certain company officers will likely have oil and gas companies relying more on third party evaluations for their reserve estimates.

This paper is not written to provide legal advice or to provide reporting standards for reserves. Its intent is to provide the reader with a basis upon which to make decisions regarding reserves reporting and to organize the discussions available publicly. Each company should consult with their reserve estimator as to their unique reporting requirements.

Reserve estimates are prepared by oil and gas companies as a normal part of their business and may include not only estimates of reserve quantities, but also estimates of future producing rates, future net revenue, and the present value

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of the future net income.¹ The definitions used for the reserves reported should be identified and noted in the reserve report. The SEC reserve definitions are primarily concerned with reserve reporting in financial situations and as such focus on the proved category and are more stringent than those of the SPE/WPC. With the 2008 revision, the SEC allows, but does not require reporting probable or possible reserves as well as proved reserves. The purpose of the SEC definitions is to help mitigate the risk involved with oil and gas financial transactions. The Society of Petroleum Engineers/World Petroleum Congress (SPE/WPC) also allows the reporting of probable and possible reserves along with proved reserves. These categories of reserves involve more uncertainty and risk than proved reserves and are intended to be used by the company for planning and capital allocation.

The SPE/WPC revised their reporting document in March 2007. Four prior documents, the 1997 SPE/WPC Petroleum Reserves Guidelines, the 2000 SPE/WPC/AAPG Petroleum Resources Classification and Definitions, the 2001 SPE/WPC/AAPG Guidelines for the Evaluation of Petroleum Reserves & Resources and the 2005 APE/WPC/AAPG Glossary of Terms were combined into one document, the SPE/WPC/AAPG/SPEE Petroleum Resources Management System (PRMS). The new system has classification modifiers. The terms developed and undeveloped can be applied to proved, probable and possible reserves. Reserves, Contingent Resources and Resources can be modified by project maturity. Contingent Resources can be divided into marginal economic and sub-marginal economic. The PRMS applies to conventional as well as unconventional resources. The PRMS uses forecast conditions as the base case, but does allow the use of constant conditions.

The SEC revised its reserve reporting guidelines with new rules December 31,

¹ Auditing Standards for Reserves, SPE, June 2001. "Estimates of Reserve Information are made by or for Entities as a part of their normal business practices. Such Reserve Information typically may include, among other things, estimates of (i) the reserve quantities, (ii) the future producing rates from such reserves, (iii) the future net revenue from such reserves and (iv) the present value of such future net revenue. The exact type and extent of Reserve Information must necessarily take into account the purpose for which such Reserve Information is being prepared and, correspondingly, statutory and regulatory provisions, if any, that are applicable to such intended use of the Reserve Information."

2008, which are effective January 1, 2010. This is the first major revision of the SEC reporting guidelines since they were initially adopted in 1978 and 1982. The SEC is attempting to align their rules with the PRMS guidelines and make them more compatible with current industry practices. The final rule is in 74 Fed. Reg. 2157 published on January 14, 2009.² The new rules should help the market to better evaluate the various oil and gas companies.

The December 31, 2008 SEC guidelines change the way prices are calculated to a 12 month average price, thus ending the prior use of the single day price at the end of the year. The SEC definition of proved oil and gas reserves has changed and now allows for the inclusion of various non-traditional resources, such as bitumen and oil and gas shale, as reserves. One difference between the PRMS and the SEC definitions is the use of the term “economic producibility” instead of “commerciality” in the definition of reserves. The new guidelines change the reporting of proved undeveloped reserves and require disclosure of progress toward development of those reserves. They allow, but do not require, the reporting of probable and possible reserves. The SEC has broadened the types of technology which can be used to establish reserves and reserve categories. The terms “reasonable certainty”, “analogous reservoir” and “bitumen” have been defined by the SEC. The SEC guidelines will require disclosure of the qualifications of the person responsible for the final reserve estimate. The SEC will also require disclosure of the reserves in each foreign country having 15% or more of the company’s reserves.

Reserve estimates are prepared for a variety of reasons and thus are based on a variety of definitions and guidelines. Primarily, reserve definitions provide a basis to quantify risk and uncertainty. Reserve estimates are required for oil and gas companies that filing with the SEC. Reserve estimates are used by oil and gas companies to plan their spending and evaluate which projects receive how much of the budget. Reserve reports are required by banks and other lending

² “SEC Issues Final Rule on Modernization of Oil and Gas Reporting”

Fulbright Briefing, Robert S. Ballentine, Daniel M. McClure, Laura Ann Smith and Harva R. Dockery, January 2009.

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institutions to provide security for loans meant for drilling or development of properties. Reserve estimates are used to determine the value of acquisitions and divestitures. Investors use reserve reports to determine the whether or not to participate in a project or invest in a company. Reserve reports are also used in litigation involving mineral interests. The user of the report should identify the guidelines used to prepare the report before relying on its conclusions.

China began allowing outside companies to explore for oil and gas in 1979 in the South China Sea, but the results were disappointing. In 1994, China opened the East China Sea and Bohia Bay. The discoveries in these two new areas are larger, but the geology is such that major discoveries are not likely to be made. The sediments in China's basins are primarily fluvial rather than marine. The sands are discontinuous and the reservoirs are not as prolific as in some other basins. In 1985, China allowed the first outside onshore exploration in rather poor areas in the south and eastern parts of China. In 1994, exploration was finally allowed in a part of the Tariat Basin, but again the results were disappointing.

The rules affecting minerals in China were codified under the Mineral Resources Law of the PRC, March 19, 1986 and amended January 1, 1997.³ The PRC reserve definitions have recently been rewritten to be more in line with those of the SPE/WPC. Under the new law foreign enterprises have the same exploration rights as domestic companies. Exploration permits are granted for seven years for oil and gas blocks. The basic exploration block is about 848 acres and is based on one minute of longitude and one minute of latitude. The maximum number of blocks is forty for an oil and gas exploration permit. The concessions run for three years, but can be renewed for two year periods if a commercial discovery is made.⁴

There are three state owned oil companies in China – CNPC, CNOOC, and SINOPEC. CNPC is the largest and operates mainly onshore along with SINOPEC. CNOOC operates primarily offshore, and is a partner with SINOPEC

3 Chinese Mining Law Overview, W. L. MacBride, Jr, Wang Bei, 2001.

4 Id.

in some offshore properties. All three of the Chinese oil companies are registered on the New York Stock Exchange and as such report reserves using SEC reserve definitions. Although the PRC reserve definitions are now similar to the Society of Petroleum Engineers/World Petroleum Congress (SPE/WPC) definitions and are moving more in that direction, there are still differences between them and the SEC reserve definitions. One of the purposes of this article is to help understand and explain those differences.

Who Defines Reserves?

The two primary sets of reserve definitions have been promulgated by the SEC and the SPE/WPC. Although there are other reserve definitions in use, they are not as widely used. There are efforts underway, however, to establish a set of definitions modeled around the SPE/WPC definitions that will be universally accepted. The SEC reserve definitions are required for the standardization of financial reporting by oil and gas companies, both domestic and foreign, registered on the stock exchanges of the United States. The purpose of the SPE/WPC reserve definitions, on the other hand, is to standardize reserves reporting by individual companies and countries.

Security and Exchange Commission (SEC)

The SEC's role is to protect investors and insure consistency in the financial markets. With the advent of Sarbanes-Oxley, the SEC is more motivated to insure full and complete disclosure to the investing public of a company's finances as well as transparency of the company's operations. The SEC definition of proved reserves is intended to comply with the SEC's stated mission to provide a consistent basis for reporting reserves among public oil and gas companies.

The SEC definitions were written at a time of long term gas contracts, more federal regulations of gas was sold on the interstate markets, and more stable prices. During that period of time, the petroleum industry was also more focused on the domestic arena rather than the international.

Financial Accounting and Standards Board (FASB)

The Financial Accounting Standards Board establishes standards for financial accounting and reporting. FASB69 establishes procedures for reporting reserves and costs and the year end pricing standard used in oil and gas reports used for

documents submitted to the SEC.

Society of Petroleum Engineers (SPE)

The Society of Petroleum Engineers is an organization of professionals who work in the petroleum industry. Their stated mission is to collect and disseminate technical information about the exploration, development and production of petroleum resources for the benefit of the public.

The SPE originally promulgated reserve definitions in 1964, with revisions in 1981 and 1987. The WPC wrote its reserve definitions independently in 1983.

The SPE and WPC definitions were combined in 1997 for definitions of proved, probable and possible reserves (See Appendix D). They were written to provide a standardized set of definitions for the petroleum industry.

The SPE is still working to standardize reserve definitions worldwide. They monitor the activities of other groups and recommend revisions to the definitions as necessary. They have a committee to continually monitor revisions others are making to their reserve definitions.

The SPE has addressed standards for reserve audits and they are attached as Appendix E. They discuss compliance with reserve definitions, the qualifications of the reserve auditors, the standards of objectivity and independence, the standards to use when estimating or auditing reserves.

World Petroleum Congress (WPC)

The World Petroleum Congress is an organization whose stated purpose is to promote the management of petroleum resources worldwide for the benefit of mankind.

The World Petroleum Congress consists of 61 countries which represent over 90% of the major oil and gas producing and consuming countries in the world. It is involved in trying to establish a consistent worldwide set of reserve definitions and reporting

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standards. In 1987 they combined their definitions with those of the SPE.

American Association of Petroleum Geologists (AAPG)

The AAPG is an organization of geologists which is concerned with the science of petroleum geology.

In 2000, the SPE and WPC together with the AAPG published resource definitions, further expanding the definitions into Contingent and Prospective Resources (See Appendix G). These definitions address reserves that are not currently economic or technically feasible to develop and reserves that have not been discovered.

Society of Petroleum Evaluation Engineers (SPEE)

The SPEE is an organization of professionals whose primary focus is reserve estimation.

The SPEE sponsors annual forums designed to help the industry develop a better understanding of the SEC reserve definitions.

International Energy Agency (IEA)

The International Energy Agency was created in 1974 and consists of 26 countries in Europe including the United States. They are committed to joint efforts to meet supply emergencies, and to assist in the integration of energy policies. It is also trying to establish a consistent worldwide set of reserve reporting definitions and standards.

International Accounting and Standards Board (IASB)

The International Accounting Standards Board is equivalent to the FASB in the United States. They are concerned with a standardized set of reserve definitions.

United Nations (UN)

The UN is currently working to merge the UNFC classification and the SPE/WPC/AAPG classifications and establish a standardize system for coal, uranium and petroleum.

Energy Information Agency (EIA)

The Energy Information Agency of the U.S. Department of Energy uses the SPE/WPC reserve definitions. They collect data and make forecasts and analysis of petroleum information.

Alberta Securities Exchange

The Alberta Securities Exchange updated its reserve definitions in 2002 with NI 51-101. The Canadian Institute of Mining and Petroleum has provided reserve definitions for proved, probable and possible reserves. The Alberta Securities Exchange is equivalent to the SEC in the United States. Alberta Securities Exchange requires the use of outside auditors for companies under a certain size.

China

The Ministry of Geology and Mineral Resources was established by China in 1952. China's oil in place estimate was first made in 1953 in the Yumen Area of the Gansu Province. In 1998, the Ministry of Land and Resources was created with one of its major functions being reserves management.

In 1977, China through the Ministry of Petroleum issued guidelines for geologic reserve calculations. A criterion for oil and gas estimates was set up in 1982 by the Research Institute of Petroleum E&D. In 1984, the China National Reserves Committee began studying the criteria for oil and gas estimates.

China in 1988 published standards for reserve reporting through the National Standard Bureau which are included in the P.R.C. – Petroleum Reserve Standard.