



SPE 110617

Methods for Incorporating Costs; Pricing; Gas Shrinkage and Transport Tariffs; NGL and Inert Revenues; and Working Interest in Gas Plants and LNG Projects into Reserve Estimates

John McLaughlin, SPE, and Brad Gouge, SPE, Ryder Scott Company Petroleum Consultants L.P.

Copyright 2007, Society of Petroleum Engineers

This paper was prepared for presentation at the 2007 SPE Annual Technical Conference and Exhibition held in Anaheim, California, U.S.A., 11–14 November 2007.

This paper was selected for presentation by an SPE Program Committee following review of information contained in an abstract submitted by the author(s). Contents of the paper, as presented, have not been reviewed by the Society of Petroleum Engineers and are subject to correction by the author(s). The material, as presented, does not necessarily reflect any position of the Society of Petroleum Engineers, its officers, or members. Papers presented at SPE meetings are subject to publication review by Editorial Committees of the Society of Petroleum Engineers. Electronic reproduction, distribution, or storage of any part of this paper for commercial purposes without the written consent of the Society of Petroleum Engineers is prohibited. Permission to reproduce in print is restricted to an abstract of not more than 300 words; illustrations may not be copied. The abstract must contain conspicuous acknowledgment of where and by whom the paper was presented. Write Librarian, SPE, P.O. Box 833836, Richardson, Texas 75083-3836 U.S.A., fax 01-972-952-9435.

Abstract

This paper reviews some of the ways that pricing and costs; gas composition and usage; entitlement interests; project approvals; and reserves aggregation affect reserve estimates and methods for incorporating these parameters into reserve studies. Techniques are discussed from the perspective of both SEC (Securities and Exchange Commission) and SPE/WPC/AAPG/SPEE (Society of Petroleum Engineers; World Petroleum Council; American Association of Petroleum Geologists; Society of Petroleum Evaluation Engineers) reserve definitions under the Petroleum Resources Management System (SPE-PRMS). In the cases where the definitions are not explicit as to processes for incorporating the above-ground parameters, the authors briefly discuss issues to consider such as past guidance by the SEC and industry norms for interpretations of the definitions.

In general, the SEC and SPE/WPC/AAPG/SPEE agree in how to account for many of the commercial and non-reservoir parameters. Where the two sets of definitions most markedly diverge are:

- Application of commodity prices
- Treatment of revenue and/or volumes of non-hydrocarbons
- Inclusion of fuel gas as reserves or as projected “sales gas”
- Inclusion of hydrocarbons recovered by unconventional means (i.e. mining and processing)
- Criteria used for differentiating gas re-injection versus injection and storage
- Consideration for the appropriate level of aggregation in summarizing reserves portfolios

SEC and SPE-PRMS definitions tend to agree on methodology and practice in the areas of:

- Sales reference points and pressure basis
- Booking dry versus wet gas
- Inclusion of coal bed methane (CBM)
- Calculation of entitlement net interests for production sharing agreements
- Approval levels required for a project to be classified as proved

The purpose of this paper is not to pass judgment on either the SEC or SPE-PRMS definitions but rather to provide a summary of the methods used to account for some of the more common commercial and non-reservoir related aspects that arise in reserve estimation.

Introduction

Proper accounting of commercial and non-reservoir factors, “above-ground” parameters, are critical in determination of reserves. In some cases the SEC and SPE-PRMS reserve definitions require different methods be used to account for these factors. This paper summarizes methods for integrating the SEC and SPE-PRMS requirements for above-ground circumstances into reserve studies. It also highlights areas where the industry does not always interpret these definitions consistently.

This paper primarily focuses on proved reserve definitions. However, The SPE-PRMS also sets forth a framework and definitions for probable and possible reserves as well as contingent and prospective resources. Generally, above-ground issues are treated the same regardless of the SPE-PRMS reserve or resource class. Notable exceptions in which treatment may differ are standards for issues of project approvals and concession terms which will be discussed specifically.

This paper groups above-ground issues into five areas: pricing and costs; gas composition and usage; entitlement interests; project approvals; and reserves aggregation.

Commodity Prices

The oil, gas, and natural gas liquid prices are some of the most critical components in determining the future value of a