

**IPTC 12291**

## **Piceance Drilling: Technology Coupled With Wellbore Manufacturing Processes Critical To Delivering Predictable Results**

C. D. Chisholm, S. A. Harris, T. J. Mashinski, ExxonMobil Development Company

Copyright 2008, International Petroleum Technology Conference

This paper was prepared for presentation at the International Petroleum Technology Conference held in Kuala Lumpur, Malaysia, 3–5 December 2008.

This paper was selected for presentation by an IPTC Programme 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 International Petroleum Technology Conference and are subject to correction by the author(s). The material, as presented, does not necessarily reflect any position of the International Petroleum Technology Conference, its officers, or members. Papers presented at IPTC are subject to publication review by Sponsor Society Committees of IPTC. Electronic reproduction, distribution, or storage of any part of this paper for commercial purposes without the written consent of the International Petroleum Technology Conference 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, IPTC, P.O. Box 833836, Richardson, TX 75083-3836, U.S.A., fax +1-972-952-9435.

---

### **Abstract**

The ability to effectively integrate drilling technology and wellbore manufacturing principles is key to the successful development of the Piceance Basin. The basin is a tight gas unconventional resource located in western Colorado, U.S.A. The subsurface environment is highly variable where significant lost returns events are encountered, which contribute to wellbore instability and narrow drilling margins. Vibrational effects on downhole components provide additional complexity. Coupled with surface locations in rugged terrain and ambient temperatures ranging from -10°F to 90°F, significant obstacles exist to achieving consistent, low cost drilling performance.

The purpose of this paper is to detail the benefits and challenges observed using the approach taken by the operator to evaluate technologies and simultaneously implement wellbore manufacturing processes. These processes have application for any large-scale development requiring continuous improvement and disciplined implementation of technology.

To meet the project objectives, the operator has implemented a methodical approach to introduce technologies, which leverage both performance and science based analysis. Pilot programs are utilized to determine the technical and economic benefits of each new technology. Technical evaluations discussed include ultra lightweight cementing, fracture closure stress treatments, and use of vibration modeling tools.

In parallel to the technology pilots, wellbore manufacturing processes are implemented to improve well delivery time and capture cost savings associated with standardized design, repeatable operations, and economies of scale. Examples of these processes include ExxonMobil's Fast Drill Process, a flat time reduction initiative, and batch drilling operations.

### **Introduction**

The Piceance Creek Field is located in the Rio Blanco County of northwestern Colorado. The operator has interest in approximately 300,000 acres in the Piceance Basin including the Piceance Creek, Freedom, Liberty, and Independence Units. **Fig. 1** shows a map of the Piceance field and **Fig. 2** illustrates the general stratigraphy.

Until 1998, most gas producers in the field were drilled to the Wasatch A (2,500 to 3,500 ft TVD) and Wasatch G (5,000 to 6,000 ft true vertical depth (TVD)) formations. These reservoirs have been produced for over 40 years, resulting in pore pressure depletion as low as 2 to 3 lb/gal. In the 1970's, the deeper Mesaverde was discovered below 7,000 ft TVD, and in 1998, production wells began to be drilled to this formation.

In 2004, the operator embarked on a phased development program for the Piceance acreage. The development program, currently in its early stages, will likely include drilling of several thousand wells to be drilled across the field over the life of the project. The Piceance Creek Field Drilling Program is designed to meet the requirements of this large-scale development program. One of the key objectives of the drilling program is to deliver predictable results through optimized well designs and drilling operations. In order to accomplish this objective, the operator has implemented a program of wellbore manufacturing processes that incorporate continuous improvement, design one build multiple, and total system cost concepts.