

Reliable Method of Achieving Annular Isolation for a Multi-Stage Fracture Treatment in an Air Drilled Hole.

[SPE 125866 - Charlestown](#) / [SPE 125866 - West Virginia](#)

Abstract

With conventional reserves in the United States in a decline, more and more operators are turning to unconventional reservoirs such as shale gas to meet the energy needs of the country. Unconventional reservoirs provide additional economic reserves in the United States through advancements in technologies and new applications for existing technologies. There are a number of shales in the Appalachian Basin that contain trillions of cubic feet of recoverable gas reserves. The Huron Shale, a Devonian aged formation, has been developed since the early 20th century. The Huron Shale is a very low pressure formation and wells are drilled with air to minimize formation damage from drilling fluid. To achieve optimum gas flow, the wells must be stimulated. The most common methods used are hydraulic fracturing with N₂ gas only or N₂ foam with proppant. There are many studies in the literature with no clear indication of which method is best. The benefits of N₂ only are presented in this paper.

Areas of the Huron shale that once showed to be non-productive with vertical wellbores are now being developed through advancements in horizontal drilling and cement-less multi-stage fracture treatments. One of the critical components of a successful multi-stage fracture treatment in a horizontal wellbore is effective annular isolation. Effective annular isolation ensures that fracture placement is known and that the entire length of the lateral is treated. This paper will describe one approach in completing and performing multi-stage fracture stimulations in an air drilled hole using inflatable casing annulus packers and ball activated frac sleeves.

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