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## Case History of Sequential and Simultaneous Fracturing of the Barnett Shale in Parker County

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### Abstract

Since 2005, Williams Production Gulf Coast Company has drilled over 100 horizontal wells in the Barnett Shale. The Barnett Shale is an unconventional gas reservoir that encompasses a nineteen county area in the Fort Worth Basin. Slick-water fracturing is the primary technique that has been used to hydraulically fracture the wells.

Recently, Williams as well as several operators have tried fracturing two or more adjacent wells simultaneously with the goal of exposing the shale to more pressure and produce a more complex web of fractures, thereby improving the initial rates and reserves. Simultaneous fracturing or simo-frac technique is expensive and requires much more planning, coordination and logistics as well as a larger surface location.

In this paper, the case history of sequential and simultaneous fracturing of four similarly drilled and completed horizontal azimuth wells in Eastern Parker County, is discussed. All the four wells were stimulated with near identical fracture treatments. The sequentially/simultaneously fractured wells resulted in IPs of 3.3 MMscfd to 3.5 MMscfd with 30-day averages ranging from 2.1 MMscfd to 2.9 MMscfd. The 4<sup>th</sup> well was a single offset horizontal well drilled with effective lateral 2400 ft less than a quarter mile to the north but had significantly lower IP of 2.3 MMscfd and 30-day average production of 1.2 MMscfd. The initial comparative test results are very encouraging and indicate a more complex fracture network being created in the vicinity of the sequentially/simultaneously fractured wells, which results in a significantly improved well performance.

Williams continues to evaluate the benefit of simultaneous fracturing and has done more simo-frac jobs in other counties with good results. As in this case history, due to surface and lease constraints, many of the simo-frac jobs are being done in wells that are drilled

from the same dual pad and have well spacing of the order of 500 ft to 700 ft. The paper also provides an analysis of the simultaneous fracturing jobs done to date in Parker and Johnson County.

### Background

The Barnett Shale has evolved into the pre-eminent shale-gas resource plays in the US and is now considered by many as the largest onshore natural gas field in the United States. The productive part of the formation is estimated to stretch an area covering 5000 square miles, encompassing 19 counties (Figure 1). According to the latest figures from the Texas Railroad Commission published in June 2008, there are more than 7700 producing wells and 185 active operators in the Barnett Shale with permits for more than 4,500 additional wells. Production from Barnett Shale currently exceeds 3.7 Bcf/d, accounting for more than 15% of Texas gas production, and more than 3.8 Tcf of gas has been produced from the Barnett Shale since 2000<sup>1</sup>.

Simultaneous fracturing (simo-fracs) of paired offset wells is one of the recent trends in Barnett fracturing and is being increasingly used by many operators. In this technique, two or more adjacent wells that are roughly parallel to each other, are fractured simultaneously. The goal is to expose the shale to more pressure and produce a more complex, “three-dimensional web” of fractures by increasing the density of the hydraulic fracture network and increasing the surface area created by the frac job. The drainage area of each of the wells is enhanced as the frac fluid is pushed into the space between the two wells that would not have been fractured if the operator had drilled only well<sup>2-3</sup>.

Simo-fracs are expensive and require much more coordination and logistics and a larger location. At the same