TECHNICAL PAPER

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TEST METHOD TO OPTIMIZE ACID-SOLUBLE CEMENT FOR UNCONVENTIONAL GAS COMPLETIONS


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ABSTRACT

In recent developments of unconventional gas reservoirs, there has been a move towards drilling horizontally to increase formation contact with the objective to increase production. A longer horizontal extension gives greater formation contact. However, these extended laterals must be cemented which has caused constraints on optimal reservoir production. Studies have indicated that conventional cements are one of the primary causes resulting in reduced fracture initiation.

Acid-soluble cements have been advocated for use in unconventional gas reservoirs as a means to reduce the rate of inefficient fracture initiations. The logic behind using acid-soluble cement was based on field study examinations completed in 2005. These studies indicated that more than 25% of cemented horizontal laterals experienced fracture initiation problems compared to 4% for uncemented horizontal laterals. In acidizing acid-soluble cement in the area of strategically placed clusters, conditions approaching open hole are obtained similar to that of uncemented horizontal laterals. Cement remaining between clusters provides sufficient zonal isolation for well bore stability.

There are no standard tests to define the characteristics of acid–soluble cements such as acid solubility or rate of dissolution that are factors crucial to obtaining good cement removal and minimal near well-bore issues. In this context a prototype test method has been developed to more closely simulate dissolution of acid-soluble cement for unconventional gas reservoir applications. Data obtained indicate the benefits of such a method to define the most appropriate acid-soluble cements, acid treatments and develop improved systems.

Published test parameters vary considerably and given the number of variables involved in dissolution techniques there is a question as to what defines a good acid-soluble cement. Development of a test method that simulates down hole conditions provides a tool to design acid-soluble cement systems to optimize open hole around perforations and ultimately minimize fracture initiation problems.

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