SPE-230527-MS

Utilizing Expandable Liners to Restore Casing Integrity and Continue Well Stimulation Operations

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Abstract

The concept of utilizing an expandable liner is presented to restore casing integrity when unexpected casing damage occurs during well stimulation. This solution allows the operator to continue with additional planned frac stages with little downtime or changes to the overall operational plan.

A solid expandable liner is a specially designed casing string that is cold-worked downhole to plastically deform the casing and make it larger than its run-in-hole OD. It has metal seals on the OD of the casing that provide a pressure seal and anchor the new casing string/patch into the existing casing to isolate casing damage. The planning and preparation process is discussed including boundary conditions, diagnostic procedures such as cased-hole logging and wellbore cleanout, followed by the installation process of expanding the liner at the given setting depth.

The expandable liner solution is compared to more traditional solutions for addressing casing damage during well stimulation, such as cement or resin squeezes and conventional liners. Six field case studies are presented showing different scenarios where unexpected casing damage occurred during fracturing operations and an expandable liner was used to restore casing integrity and allowed the frac operation to continue.

Expandable liners are an innovative solution that can help save operators rig time and money while providing a permanent repair that still has a large enough pass-through ID and high enough pressure ratings to allow the well stimulation and completion to be executed as planned without deviation to pressures or equipment sizing.