

Modify & Extend Casing Plunger Technology to Tubing

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This proposal offers to evaluate the recently patented advances in casing plunger applications in larger diameter casing for the feasibility of extending the proven technology in casing to stripper well gas production in 2-3/8 inch and 2-7/8 inch tubing applications. The technology, while similar, will require substantial modifications in the design concept and material selections to successfully extend the benefits of larger diameters of casing to the smaller diameters of tubing

Many applications exist in which 2-7/8 inch tubing was cemented in the hole in what has been called tubing-less or casing-less completions. Multiple strings could produce multiple zones quite economically during the flush production of the reservoir. Other applications exist in older, depleted wells which have experienced a casing leak and economics and well bore pressure did not warrant traditional repair procedures. In many cases, the 2-3/8 inch or 2-7/8 inch tubing was run back in the hole with a packer that isolated the casing leak. Such temporary repair procedures further complicate the production in stripper wells and reduce the feasibility of a successful casing leak repair. In all these applications, no tubing/casing annulus exists for gas pressure build up to act as an energy storage chamber to assist conventional tubing plungers.

As reservoir pressures declined over the years, traditional artificial lift remedies were curtailed in so-called tubing-less completions. Although rod pumps, siphon strings and tubing plungers extended production in many applications for a while, further depletion now severely limit these methods as economical solutions for extending the productive life of stripper wells.

Unrepaired casing leaks isolated by a frequent "quick-fix" method of running the tubing with a packer, offers some immediate resolution. However, as reservoir pressure further declines, two serious conditions occur. First, conventional tubing plunger or siphon string production becomes less effective and more costly to maintain. Rod pump installation may be hindered, or even impossible if the packer cannot be released and the tubing repositioned for effective rod pump operation. Second, and of greater concern, the inevitable fluid invasion into the depleted producing zone that will result in drilling out the packer or repairing the casing leak greatly increases the risk of flooding out the producing zones, thus increasing the risk of the loss of all production.

If a tubing plunger can be designed that employs the principles and technology of successful casing plungers, then daily production and future recovery can be substantially increased for many stripper wells.

This proposal covers the design, drafting, and manufacture of tubing prototypes, including the tooling required to lab test and field test both design concepts and tool prototypes.