Experiences in Eliminating Steam Breakthrough & Providing Zonal Isolation in SAGD Wells
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Abstract
For the last two decades major oil companies in Canada have been paying much more attention to
heavy oil, which is an alternative unconventional reservoir (Canada and Venezuela have some of the
largest bitumen deposits in the world). The main reasons for development could be the continued high
price of oil, and improved technology to extract heavy oil, with a high recovery factor (up to 60% of the
oil in place). Injecting steam is the most distinctive technique of heating up the formation rock and
assisting in oil flow. Controlling steam injection and its distribution, and achieving economical recovery
in an effective manner, has been a continuous mind-boggling issue for the heavy oil producers, and has
been a great challenge.

High-temperature water and oil swellable packers have been developed to aid, and optimize, cyclic
steam stimulation and Steam Assisted Gravity Drainage (SAGD) applications in heavy oil reservoirs.
Simplicity is one of the great advantages of the swellable packers, which provide an ease of operation.
The packer allows for uniform, or selective, placement of steam along the entire length of horizontal
section, and is designed to handle high temperature 575°F (302°C), and more than adequate differential
pressures associated with steam injection. Screens or slotted liners are run in hole to allow steam to be
pumped in between the well pairs. Steam breakthrough, or diversion, has been experienced in
numerous wells due to lost circulation, or sand erosion and/or plugging of the slotted liners, which
creates problems for continuous production. Swellable packers can be installed in conjunction with
inflatable packers, screens, slotted liner, or scab liners, in order to distribute steam and provide zonal
isolation. In the event of steam breakthrough, swellable packers can be deployed to isolate the affected
zone(s). This intervention technique will assist in efficient continued production and the elimination of
steam breakthrough.

The technique of steam injection has been improving over the years, but still has room for refining of
the processes. Some older wells have encountered issues of steam channeling through the cemented
casing & breaking out at the surface; which has been seen to create a threat to the environment. A
horizontal well completed with slotted liner, or recently with specially designed type of screens,
provides a far better method than perforated casing for injecting steam into the formation.

This paper presents a solution with a unique technique, for SAGD wells, for resolving wasted steam
injection at the toe section of the well, and repair of steam breakthrough in production legs. Every
operator is coming across new learning experiences almost every day, although most of this information
is proprietary, we are proposing a different solution path to overcome some of these issues.

Complete paper