

Experiences in Eliminating Steam Breakthrough & Providing Zonal Isolation in SAGD Wells
[SPE 153903 - Bakersfield / SPE 157896 - Calgary](#)

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](#)