

Swellpacker® System and Gravel Pack Enable Zonal Isolation in Openhole SmartWell® System Completion

Location: Asia

CHALLENGE – A major oil and gas operator in southeast Asia required good zonal isolation of a multilayered, unconsolidated, stacked reservoir possessing several oil, water, and gas zones. The unique trajectory of the horizontal wellbore made access to mechanical flow control devices costly and problematic, therefore making it necessary to remotely control or shut off the production from multiple zones in the advent of unwanted gas or water production. The use of gravel packing techniques and sand screens were selected as the preferred method of sand control for the single, horizontal section that includes three to five zones. A series of external annular barriers to limit or eliminate zonal crossflow was a requirement while ensuring that the gravel pack of the entire zone was not negatively impacted.

Additionally, the system was required to have downhole pressure and temperature sensors installed so the different zones could be continuously monitored. To ensure that the production of each zone was properly channeled to the correct SmartWell® system interval control valve (ICV), internal zonal isolation packers were needed for each zone. These packers were required to facilitate the use of multiple feed-through lines and flatpack while helping to reduce rig time required to run traditional assemblies and helping to ensure that no lines were damaged during installation. This challenge was further complicated by the completion trajectory that has a final inclination of greater than 100°.

Challenge Summary

- Successfully isolate stacked reservoir with openhole annular barriers in a sand control environment
- Enhance the running of SmartWell system technology equipment
- Minimize operational cost and risk
- Identify a zonal isolation packer that would not require a separate completion string trip or additional services to activate

SOLUTION – Working with Halliburton, the operator chose a solution that achieves the well's pre-set goals. The solution included an aggressive drilling program that required precise wellbore trajectory using Sperry Drilling Services' Geo-Pilot® system and would later be completed using a novel and newly designed Halliburton gravel pack system, screens, and Swellpacker® systems spaced out strategically along the wellbore to isolate different zones. At the conclusion of the gravel pack operation, the Swellpacker systems were designed to swell and seal against the gravel and compact it and provide a barrier to flow in the openhole section. To increase the probability of a successful outcome in this challenging uphill trajectory well, Halliburton used its customer experience database to optimize the Swellpacker system and gravel pack design.

The solution also included an inner string incorporating Halliburton WellDynamics® remotely-operated HVC interval control valves, controlled by Digital Hydraulics™ downhole control system, and pressure and temperature sensors.

Swellpacker cable systems were selected as the cased hole isolation packers because they allow splice-free feed-through of the fiber-optic control lines for the SmartWell system technology equipment. Additionally, the packer system will activate and seal using downhole in-situ fluids, thereby eliminating the need for mechanical or hydraulic manipulation for setting. This enables the operator to use the existing rig equipment as specified.



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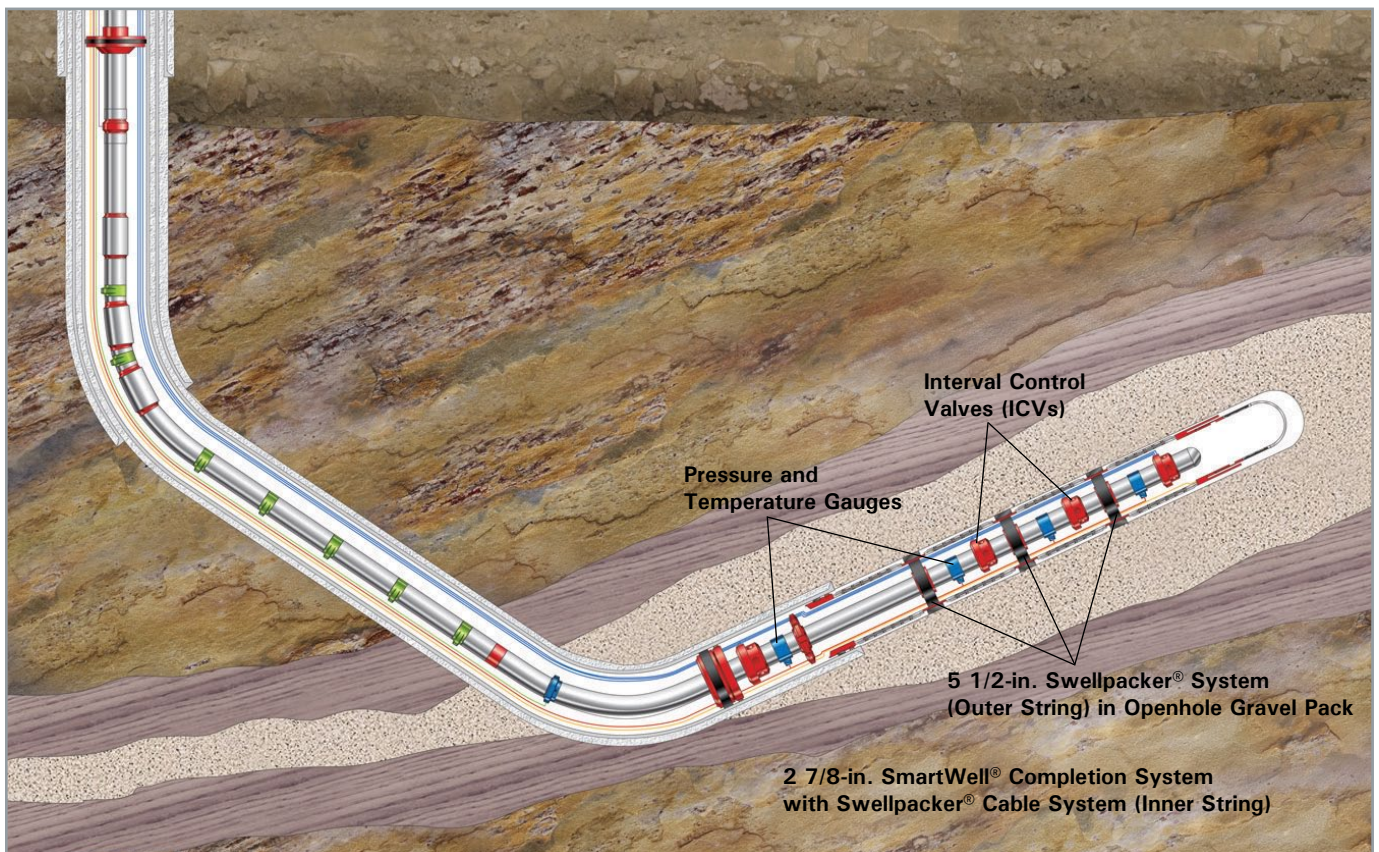
Solution Profile

- A combination of gravel pack and Swellpacker systems utilized as external zonal barriers and sand control of a multizone reservoir
- Swellpacker cable systems helped to eliminate splicing of control lines and increase overall reliability of the completion
- Swellpacker cable systems helped reduce operator expense by eliminating the use of rig time for splicing control lines

RESULT – Seven wells have been completed using this Halliburton solution with another 20+ wells planned for completion in the operator's program. The inner string with the Swellpacker cable systems was run problem-free.

In addition to improving the overall completion reliability, the use of the Swellpacker systems also improved run-in-hole completion time by approximately 12 hours, enabling the operator to realize a considerable savings on rig time.

Using the remotely operated Halliburton WellDynamics valves to shut off or choke individual zones and by monitoring the changes on the pressure and temperature sensors installed in the well, the operator confirmed that the Swellpacker systems were sealing properly and will be able to remotely monitor and control the production of the well over time.



For more information on any of the details featured here, please contact completions@halliburton.com.

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H06427 11/13

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