

Horizontal Well Completion Technology for Improved Heavy Oil Production

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Summary

The effectiveness and efficiency of heavy oil reservoir development has been the focus of the industry. More and more attention is being paid to achieve higher economic efficiency, by optimizing the use of the well completion methods. The traditional completion sand screen products (wire-wrapped / slotted screen), and the use of general steam injection method bring a lot potential risks in the long term.

The precise punched slot screen, as an effective heavy oil sand control product, has been gradually recognized by users worldwide, due to its robustness when RIH, and its comprehensive technical performance. The integration of completion and clean-out technologies can effectively save operating time for operators by conducting fluid replacement and acid pickling simultaneously after lowering down the completion string. Staged completion and staged steam injection can effectively improve intake efficiency, and provide a basis for production increase.

Introduction

Through new sand control products and the integrated completion and clean-out technology, as well as the application of staged steam injection, the recovery rate of heavy oil reservoirs can be effectively improved with the cost controlled in an acceptable range.

Theory and/or Method

PPS's Punched Slot Filtration Structure (PSFS) has much more flow path area and large connectivity between the well bore and formation, also it can reduce the pressure differential in

conjunction with the function of sand control; PPS's PSFS also can avoid the liquid flow's direct erosion to the filtration channel, and its stainless steel filtration jacket enhances the PPS's anti-corrosion ability; The PPS's PSFS can form Trapezoid slots with a 90° inner cleansing angle, the anti-plugging ability is much better than the common slotted liner; The base pipe of PPS with drilled hole has much higher strength and ability of flow than other products; The overall dimension of PPS is little smaller than the OD of casing joint, allowing for smoother action during the RIH.

(The large open area; Stronger self-cleaning capability, ensuring long-term stable production; Stainless steel material for corrosion resistance ; Increased base pipe strength; Nominal OD is conducive to screen protection during running-in of screen filter layer.)



During many completion jobs, clean-out string must be run in after the completion string arrives at the target stratum in order to release the harm to formation caused by the drilling fluid. However, the operating time is increased in this way.

The integrated completion and clean-out technology is an efficient solution which combines the clean-out string with liner hanger. In this way, we can conduct fluid replacement and acid pickling simultaneously after lowering down the completion string without using coiled tubing, saving expense. Moreover, we can cycle, opening the pump on the earth, to deal with special situations, which makes work safer.

Examples

Up to now, PPS screen has been widely used in China heavy oil reservoirs, especially in Xinjiang Oilfield of CNPC. 180,000 meters of PPS screen has been used since 2005, and

more and more PPS screen is being applied in Canada heavy oil reservoirs and is also widely used in Sudan conventional sandy wells with good results.

The integrated completion and clean-out technology was first used in the offshore oilfield of China and spread to Kazakhstan and South America.

Conclusions

With the application of new screens, we can avoid the disadvantage of other technologies, extend sand control life, and provide the ability of improving the production of heavy oil reservoir and more efficient method of sand control for heavy oil reservoir.

This will not only save the time and money, but also improve the recovery rate of heavy oil reservoirs.

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References

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