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Key Technology of Water Detection by Dragging the Pipe String in Multi-Stage Fractured Horizontal Well

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ABSTRACT

In the application of water detection technology by dragging the pipe string in the long reach horizontal wells in the Changqing Oilfield,problems such as sealing property deterioration of the matched cup packer and cup dropping while POOH occurred.Therefore,the targeted studies were carried out.Through lab simulation of the downhole environment,ball screw was used to make the cup packer reciprocatingly move inside the casing to obtain the wear amount of each 500.0 m of friction.The maximum packer bearing setting depth of 2 500.0 m was also determined through bearing tests.By improving the structure of the Y211 dragging fracturing packer and by optimizing its rubber material,Y211-1 and Y211-2 packers suitable for single-packer and dual-packer water detection technology by dragging the pipe string were developed respectively.Besides,a new Y111 packer that can be set repeatedly in the horizontal section was developed to guarantee the implementation of dual-packer string dragging water detection technology.The new type packers and string dragging water detection technology were used in six horizontal wells of the Changqing Oilfield.The application results indicated that one set of packers was able to achieve water detection in two wells,and the testing success rate increased from 91.3% to 100.0%,while the cost of a single well test was only half of that with previous cup packer string dragging water detection.The research results show that the new packers make the water detection technology more convenient and economical,and they can obtain satisfying effect when applied in long horizontal wells.