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Experimental study on pressure-increased water injection by nuclear magnetic resonance method

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Waterflooding is one of the key technology for oilfield development. Reasonable injection and production design is very important for efficient development and enhanced oil recovery. The pore size, oil and water saturation of reservoirs are different, and the remaining oil saturation occurrence mode is different. How to effectively start the remaining oil and which pores start the remaining oil is one of the problems concerned in oilfield development. Core displacement test is used to develop water injection in different pressure gradients. The effects of injection and production pressures, permeability and different pressure gradient on oil recovery factor and water-cut were evaluated by means of nuclear magnetic resonance test. The results show that oil recovery factor increases first and then decreases with the increase of injection rate. Oil recovery factor increases first and reaches a maximum at 8mL/min, and the total recovery factor of high, middle and low permeability cores decreases in turn. The recovery factor increased to the highest when the pressure was increased to 8mL/ min. The pore structure of the core is dominated by small pores and large pores, while there are a few medium pores, and large pores are the main contributing areas of oil production. For low permeability core, the oil in small pores is mainly moved by pressure increasing, while for medium and high permeability core, the oil in large pores is mainly moved for pressure increasing.

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References

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