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Effectiveness of in-situ microbial enhanced oil recovery in a post-polymer flooded reservoir

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This study investigated the effectiveness of In-situ microbial enhanced oil recovery (IMEOR) in a post-polymer flooded oil reservoir located in SaNan oilfield, Northeast China. Two rounds of injection of nutrient medium were intermittently injected into the producing block and then monitored. The main results showed that the dominant bacteria of 4 production wells, *Thauera* of Beta-proteobacteria, *Pseudomonas* and *Acinetobacter* of Gamma-proteobacteria were directional activation, which showed a consistent enhancement. The abundance of *Methanosaeta* and *Methanolinea* increased, and showed a regular alternation with an increase of oil production. It contributed to production of bio-gas, leading to increasing of the injection pressure from 11.3 MPa to 13.9 MPa before the experiment which increased by more than 2.0 MPa. The contents of CO₂ and CH₄ varied alternately, and the

variation was consistent with the order of injection of each activator. H₂ was detected in the reservoir associated with the gas in the observation area. A large amount of enriched bio-gas was dissolved into and mixed with crude oil, which brought increasing of the proportion of light components in the whole hydrocarbon of the recovered oil. The other effect was activated microbial metabolites productions formed bio-plugs, which benefits for improving of the absorption profile and the production profile. A total of 6,243 t of incremental oil production was achieved, and an oil recovery rate increased by 3.93 % (OOIP) to the end of 2015. Our trial suggested that IMEOR can be implemented for effective enhancement of further oil recovery from polymer flooded oil reservoirs.

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