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Field Application of Phenol Formaldehyde Gel in Oil Reservoir Matrix for Water Shut-off Purposes

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Abstract

A few weeks after the start of the water shut-off, the production being shut-off by the water shut-off system was reduced to less than 1% of the original production level. Low injection water cut (WCT) levels (less than 8%) were achieved in combination with a high WCT, which was maintained after the post-treatment.

... of ... (WCT) levels. ... shut-off by ... ation system ... roduction ... (D) with less ... ess than 8 ... ontact level ... e high WCT, ... the average ... reafter,

production gradually stabilized in the neighborhood of 115 BOPD with a WCT of 48%.

Cheap chemicals and a fast treatment method have resulted in a payback time span of 5 days and made an additional profit of U.S. \$0.6 M. The water shut-off job resulted in an impressive commercial success; technical success, however, was less than satisfactory due to the fact that, in spite of using a water-thin monomeric solution, only 40% of the designed volume could be injected due to low injectivity resulting in an abnormal pressure build-up. In addition to the gel development and treatment experiences, this article describes in detail the results of further lab investigations carried out to identify the possible reasons causing injection failure.

Keywords: field application gel oil reservoir phenol formaldehyde water shut-off

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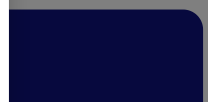
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