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Modelling of chemical water shut-off treatments

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Water production is one of the major problems in oil industry, which may cause corrosion of tubular, fine migration and accelerate well abandonment. Every year more than \$40 billion is spent dealing with unwanted water, so a treatment should be applied in order to reduce high water production. Many papers investigated and focused their researches on how to reduce water cut percentage. Mechanical and chemical treatments are suggested, chemical treatment represented in polymer-gel with cross linker solution proved an optimistic results. Gel can solve many types of water production problems rather than other chemical or other mechanical treatments. In this project a model constructed to determine applicability of gels in reducing water

permeability. The model included equations predicted using statistic software (SPSS) that determine $Frrw$ (Water residual resistance factor) and Frr_o (Oil residual resistance factor) by inserting polymer concentration then determine the optimum concentration which gives the most desired results. A real field data obtained from Z field (well X, well Y, and Well Z) and gel applicability in permeability reduction had been tested, then an optimistic result obtained. According to this study there is a great chance to apply polymer-gel as water shut-off technique. For future work a core flooding study must be constructed to obtain more set of data and improve equations accuracy.

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