

**CONTROL OF WATER PRODUCTION USING DISPROPORTIONATE PERMEABILITY REDUCTION
IN GELLED POLYMER SYSTEMS**

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A two-well field test is proposed to determine if the water production rate following treatment of a well using a gelled polymer system can be reduced by a process in which the gel that has formed in situ is dehydrated following placement by slow injection of oil. Oil flow channels formed by the dehydration process exhibit preferential permeability to oil over water because of the large permeability reduction when water displaces the oil from these channels leaving a residual oil saturation with low permeability to water. This mechanism, termed disproportionate permeability reduction, reduces water permeability by at least an order of magnitude in laboratory tests. It is believed that reducing the permeability of these flow channels to water will enhance displacement of oil from other regions of the reservoir containing mobile oil as water flows from the aquifer to the wellbore under the prevailing pressure gradient. Three results are anticipated: 1) substantial reduction of water production rates after treatment, 2) increased incremental oil production caused by creation of new displacement paths for the water moving to the wellbore and 3) longer interval between gel treatments because the dehydrated gel is stronger than the original gel because the polymer concentration increases in the gel that is dehydrated. The field test is a cooperative field demonstration program between the Kansas University Energy Research Center and the Vess Oil Corporation, an independent oil company located in Wichita, Kansas.