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A Comparative Study on Carbon Dioxide Miscible Injection Modes

F. M. Nasir & B. M. R. Demiral

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Abstract

This article presents an experimental study of comparing different carbon dioxide (CO_2) injection mode for a reservoir in Malaysia (Alpha X Reservoir). The main objective is to determine the most technically optimum miscible CO_2 injection mode or strategy for this field. Using coreflood equipment, miscible CO_2 displacements were conducted on four berea core plugs that have been saturated with crude oil from the reservoir. Almost 2 PV of water and/or gas were injected into the cores with different modes. The experiments were conducted at the minimum miscibility pressure of the crude oil to ensure that CO_2 is fully miscible with the oil. The results indicate that the simultaneous gas injection yields the highest incremental oil recovery, about 28% oil originally in place. Based on the calculation of utilization factor and tertiary recovery factor for each injection mode, it was confirmed that simultaneous gas injection is the best injection mode for Alpha X reservoir. It gives the highest recovery per unit of CO_2 injected and utilizes relatively the least volume of CO_2 to produce a unit of oil.

Keywords:

carbon dioxide | core flooding | enhanced oil recovery | miscible

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