



Simulation Study of Different Modes of Miscible Carbon Dioxide Flooding

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Abstract:

Carbone dioxide flooding has been applied worldwide as a successful enhanced oil recovery. Carbone dioxide flooding may be applied as a continuous injection or as water alternating gas (WAG) process. Optimization of the injection mode of carbon dioxide is important for economical field application. This paper focuses on using a fully compositional simulation model for "AEB-3C" sandstone oil reservoir; in one of the Western Desert oil fields in Egypt; to predict the impact of CO₂ miscible flooding on the reservoir oil recovery and net present value (NPV), to define the best mode of operation that is straight CO₂ injection or water alternating gas (WAG) processes and to show the difference between pure and impure CO₂. Moreover, several sensitivity runs were done on the oil price to show minimum profitable value of oil price when applying such a tertiary method in the subject field.

The reservoir under study has been producing under a successful water flooding project since

May-2010. The recovery factor by the end of water flooding project is predicted as 32%.

CO₂ flooding processes have started by the end of water flooding. The used CO₂ is taken from the flared gas (which containing 75% CO₂ of its composition) of the nearest gas plant (12 km away).

A significant increase in the oil recovery factor was noticed due to applying this method; it reached up to 57%. Comparisons between different modes of operations were shown which showed better results when applying WAG process than that



with straight CO₂ injection. Moreover, sensitivities were done on the cycle periods in WAG processes and showed increase in the recovery factor with shortening the cycle periods. In addition to a comparison between pure and impure CO₂ which showed very close results.

Biography:

Ehab M. Elakhal has completed the M.Sc. in Reservoir Engineering in 2017 from Suez university. He got a Diploma in the Applied Geophysics from Cairo university in 2009. He got the B.Sc. of Petroleum Engineering from Suez university in 2007. He is currently a Head Section of Reservoir Engineering Dept. in Khalda Petroleum Company.

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1. Simulation Study of Different Modes of Miscible Carbon Dioxide Flooding

Webinar on Green Energy ; June 01, 2020; Dubai, UAE

Citation: Ehab M. Elakhal; SSimulation Study of Different Modes of Miscible Carbon Dioxide Flooding; Green Energy Webinar; June 01, 2020; Dubai, UAE