

Abstract



# Sustainable Development in Low Carbon, Cleaner and Greener Energies and the Environment

## Ehab M. Elakhal

Khalda Petroleum Co., Cairo, Egypt.

### 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.

#### **Recent Publications:**

- 1. Improved Reservoir Characterization in the Ogallah Field using Petrophysical Classifiers within Electrofacies
- 2. Microscopic Rock Characterization and Influence of Slug Size on Oil Recovery by CO2 Miscible Flooding in Carbonate Oil Reservoir
- 3. Enhanced Reservoir Description: Using Core and Log Data to Identify Hydraulic (Flow) Units and Predict Permeability in Uncored Intervals/Wells
- 4. Permeability Prediction Using Genetic Unit Averages of Flow Zone Indicators (FZIs) and Neural Networks
- 5. CO//2 MINIMUM MISCIBILITY PRESSURE: A COR-RELATION FOR IMPURE CO//2 STREAMS AND LIVE OIL SYSTEMS.

#### Webinar on Energy; September 10, 2020

**Citation**: Ehab M. Elakhal; Sustainable Development in Low Carbon, Cleaner and Greener Energies and the Environment; Energy 2020; September 10, 2020