Produced gas re-injection in a Lower Cretaceous reservoir

Mokhtari, Rasoul; Feilberg, Karen

Publication date:
2021

Document Version
Publisher's PDF, also known as Version of record

Link back to DTU Orbit

Citation (APA):
Produced gas re-injection in a Lower Cretaceous reservoir

Rasoul Mokhtari, Karen Feilberg

Lower Cretaceous oil reservoirs in the Danish part of North Sea, are deep and too tight reservoirs. The rock is mainly chalk with some clay mineral as impurity. They mostly have a high porous but too tight rock in term of permeability which makes applicability of any EOR method limited. It seems that the only feasible EOR method could be gas injection, and one of the targeted gases for injection could be associated produced gas which has a good compatibility with the reservoir fluids. Therefore, the aim of this research is to evaluate the potential of produced gas re-injection on incremental oil recovery in a lower Cretaceous reservoir.

For this purpose, after evaluating several reservoir core materials by means of CT-imaging, a core plug without any open longitudinal fracture was selected. Then this core was cleaned by injecting Toluene and Methanol. Then the core was saturated with formation water and after that the irreducible water saturation was achieved by displacing the water by oil. Then the core was aged for four weeks at reservoir condition. The dead oil in the core plug then was displaced by Live oil and then the gas injection was conducted. The experiment was done at 250 bar and 85 °C.

The results showed that the breakthrough happens at less than 0.5 PV, and the ultimate recovery factor of approximately 50% could be achieved by produced gas re-injection.

The plan for the future work is to conduct experiments using the same core (if the core survives), to evaluate the effect of injection pressure and also the efficiency of Flu gas injection. It also could add a great scientific and application value to repeat the experiments on other core samples to evaluate the repeatability of the results and also the effect of rock quality. This significantly helps to have a clearer insight in terms of application and upscaling.