

Miscible WAG Pilot - Hassi Messaoud field Field, Algeria

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Introduction

With most than 40 years of miscible gas injection history, the necessary gas injection volume is increasing year after year according to development plan of the field. In order to reduce this need of gas volume and also increase the recovery, a WAG Pilot was implemented in the field in 2006 with full package of measurements to understand the behavior of the fluids in Hassi Messaoud field with a reservoir describe like very heterogeneous.

This paper discusses a case study done on Hassi Messaoud field-Algeria, and provides an insight into the effect WAG process implementation on gas injection needs and on Expected ultimate oil recovery.

Key features

The Hassi Messaoud Field, located at 800 km South from Algiers, was discovered in 1956 by the drilling of MD1. The field came on production in 1958 and has since been established as one of the world's largest oil fields. It extends 40 km from North to South and 60 Km from East to West.

To represent the pilot WAG study, a simulation model was built covering a large area witch include the WAG pilot in order to manage the in and out flow. The simulation model uses a grid system comprising of 163200 cells (75x64x34), an LGR (Local Grid refinement) around the gas injector, and was history matched with pressure and production data. An equation of state (EOS) with 6 pseudo components was used to characterize the complexity of hydrocarbon column.

This talk is on:

- The analysis of gas injection history in the area of WAG Pilot.
- The impact of WAG process in the injected gas (volumes) and
- The effect of WAG in recovery factor in the pilot.

Conclusions:

- The WAG pilot study with reservoir model allowed us allowed us to obtain the optimum gas injection scheme in the area of the Pilot.
- The expected gas injection volume decrease with a ratio of 1/3.
- The oil recovery is appeared to hardly increase with the optimum cycling rate.
- Improving reservoir characterization is a continue challenge, such as introducing new technologies of the recent 3-D seismic.

References and Bibliography:

- Internal report on a reservoir simulation of the Hassi Messaoud field (1995-2001).
- Identify Miscibility of Miscible WAG Processes at Reservoir Level Using Observed Data - SPE ATW, April 26-27, 2004 - San Diego, CA

Speaker's Biography:

Belkacem SENNOUR, a Reservoir Engineer with Sonatrach Petroleum Engineering and Development Division in the Department HASSI MESSAOUD, which I joined in December 2001. I hold a petroleum engineer from the Hydrocarbon National Institute (INHC), Boumerdes, Algeria (2001), and an Msc in reservoir engineering from the ENSPM (Ecole National Supérieure du pétrole et des moteurs - 2001). My current interests are field characterization and simulation, oil rim development and monitoring.