

Thermal Development Opportunities in Oman

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1. Introduction

Oman has a wide variety of oil fields comprising carbonate and sandstone reservoirs with light and heavy oils many times in complex geological settings. The fields are under primary depletion or water flooded and are maturing, this has prompted the next phase of development entailing Enhanced Oil Recovery (EOR). Various EOR techniques are considered and employed among which are: Steam, Miscible Gas and Polymer flooding. The EOR portfolio is growing rapidly with three projects being implemented and large number of projects going through feasibility assessment.

For thermal recovery of the heavy oils, the focus of this presentation, the challenges are diverse. Heavy oils are found in relatively clean and thick sandstone reservoirs but also in fractured carbonates. The thermal development strategies for these fields are quite different, the first one exploits mainly viscous drive features while in the latter gravity drainage is enhanced by the injection of steam. Next to the sub-surface challenges, the energy and water management are key and get ample consideration at an early stage.

2. Key Features

PDO's EOR portfolio will be introduced, surface and sub-surface challenges of performing steam projects in complex geological settings will be discussed and issues related to fuel gas and water management and capability building are highlighted.

3. Conclusions

- Petroleum Development Oman is on the forefront in the application of different EOR methods, with chemical, thermal and miscible gas projects underway.
- The steam flood portfolio contains challenging targets in complex geological settings. Different development concepts are worked-out and implemented.
- High oil prices are both a blessing and a curse. EOR projects with higher UTC's are economically attractive but rapidly increasing market costs may render many uneconomic.
- EOR projects are water and gas/energy intensive and require timely attention.

4. References and Bibliography

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Speaker's Biography

John van Wunnik has a PhD in Physics from the University of Amsterdam. After finishing his PhD thesis he joined Shell and worked in Research and Development for 10 years on subjects related to EOR. Hereafter he was posted as an (EOR) reservoir engineer in Oman, Holland, Scotland and Oman again. Currently he is the team leader of the EOR reservoir study team and responsible for maturing EOR opportunities for field implementation.