

Applied EOR Technology & Project Management

26 – 29 March 2012 Kuala Lumpur, Malaysia



Dr. Ir. Willem Schulte

World leader in methods to enhance recovery

Former Chief Scientist with Shell , current committee member of the SPE IOR/EOR symposia in Tulsa and Oman, Chair of the IOR symposium of the EAGE.

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The global demand for oil continues to rise annually. However with depleting reserves worldwide, operators are searching for new ways to produce their existing matured assets. With the current average recovery factor of around 35% there is still a lot of oil left in reservoirs that are well characterized. This demand to recover more oil from existing assets and with recent high oil prices have triggered renewed economic interest in applying Enhanced Oil Recovery (EOR) techniques in Asia and across the world.

Course introduction

This 4 day training course addresses the relevance and basic concepts of various EOR techniques. It will explain how any EOR technology can be integrated in the full life cycle planning, starting from the current development concept, through appropriate testing to field implementation of a EOR Scheme. The application of EOR technology demands strong coordination between many disciplines and challenges can only be overcome through multi-discipline team work.

The choice for specific EOR techniques often depends upon on the proper understanding of the distribution of remaining oil. This distribution will be the result of the interplay between displacement processes and geological settings of a specific reservoir. EOR techniques are often grouped in three main areas: thermal EOR (e.g. steam soak and SAGD), chemical EOR (e.g. low-salinity waterflooding, polymer and surfactant flooding) and Gas EOR (like HC gas and CO₂ injection). The fundamentals of each of these areas will be discussed and through simple exercises the course participants will get an understanding for the relevance of various parameters. But more importantly, participants will also understand and appreciate the short comings of various techniques and how these could be addressed in a specific field application or via ongoing research activities. Based on the key characteristics of various EOR techniques, the most relevant screening criteria will be explained. Key high level field implementation aspects will be addressed including project management considerations.

On completion of the 4 day training course, participants will be able to:

- Understand key EOR techniques, their application in mature fields and current innovations today
- Appreciate the strength and weaknesses of each technique and how EOR can be optimized through specific activities and actions
- Acquire an understanding of how EOR techniques are applied in field development planning and how to overcome arising complexities
- Understand critical management aspects of an EOR project through various strategies with key stakeholders

Who is the training course for?

- Petroleum and Reservoir Engineers who are involved in studies to define EOR projects, and who require a better understanding of the technology and a broader view of EOR projects in terms of planning and execution.
- Supervisors and development managers who want a better understanding of current EOR techniques, to be able to discuss these with their experienced staff and make more informed business decisions.
- Experienced operators and engineers who want to better understand the relevance of choices to be made in field development plans.



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4 Day Course Outline

Day One

- Introduction and participants discussion on their current experience and views
- Current EOR production and outlook
- Basic principles and landscape of EOR techniques
- Timing of EOR as part of the field life cycle and the impact of external conditions like contract conditions
- Interplay of geology and displacement processes to understand remaining oil distribution and complexities to further enhance recovery
- The integrated challenge - multi-discipline issues
- Chemical Flooding
 - Low salinity flooding
 - Polymer flooding
 - Surfactant flooding

Day Two

- Chemical Flooding (Cont)
 - Alkaline Surfactant Polymer flooding
 - Implication for engineering and field design
 - Pros and cons
- Gas EOR techniques
 - Minimum miscibility concept and required operating conditions
 - CO2 flooding and its special aspects
 - CCS (Carbon Capture and Storage) aspects

Day Three

- Gas EOR techniques (cont)
 - WAG (water-alternating gas) concepts and variations
- Thermal EOR Techniques
 - Impact of temperature, basic heat balance aspects and prediction tools
 - Steam soak, steam drive and SAGD
 - High level well designs

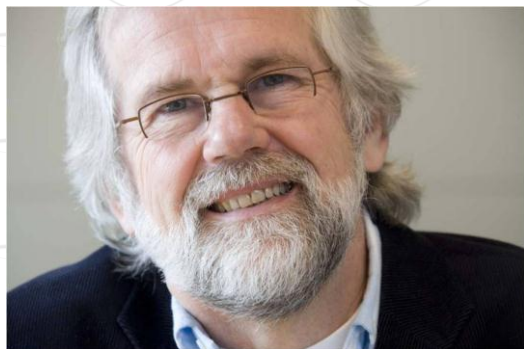
Day Four

- Screening criteria and portfolio review
- Assessment through detailed simulation work
- Interaction between various disciplines e.g surveillance and facilities
- Innovations in EOR technology today
- Key decisions for management and Decision Gate Process
- Key Economic indicators in EOR projects
- TECOP aspects (Technical, Economic, Commercial, Organizational, Political)
- Interactive session: Debating different views, insights, learning and how to make it work

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Your Expert Trainer: Dr. Ir. Willem Schulte

Willem has spent 32 years in the area of IOR/EOR, mostly internationally with Shell. His experience extends from research and field implementation to Value Assurance Reviews and company governance. He also teaches at the Delft University courses in applied reservoir engineering and field development planning.

2010-Present	CEO of SOGIC, independent consultancy firm
2007-2010	Chief Scientist RE, Shell
2003-2008	Program Manager Global IOR/EOR research, Shell
1998-2002	Value Assurance Review team leader, Shell
1996-1998	Research advisor on 4D seismic and effective properties, Shell
1993-1995	Team leader EOR research, Shell
1988-1993	Senior RE and Head RE of the Brent Business Unit, Shell Expro, Aberdeen
1979-1988	Researcher in the area of EOR and Tight gas, Shell
1978	PhD in Applied Physics on Beam Dynamics in cyclotrons, Eindhoven University

Area of expertise

Willem's expertise is in the understanding of technologies to improve/enhance oil recovery, the practical application in oil assets, knowledge on the value of technology and defining company-wide technology strategies.

He studied the basic flow concepts in oil and gas reservoirs, knows how these will play out in the anticipated development plan and where vulnerabilities lie. By such understanding it is possible to select the right IOR/EOR option for any specific field, taking into account life cycle aspects and future optimisation. Each phase in a development needs to be executed optimally and prepare immediately for the next phase of development.

As Chief Scientist RE in Shell he has been involved in many critical technology strategy decisions at Executive Committee level, key technology projects and representation of Shell to the press.

His role as Global R&D Program Manager has brought him in contact with many key technology developments (chemical flooding, low salinity flooding, steam injection) and with research into novel recovery mechanisms (microbial EOR and nano technologies).

As Value Assurance team leader Willem has travelled the world and has seen many of the key projects of Shell and reviewed the status of many new projects, e.g. Kashagan Sour Gas Injection, Sakhalin Field development, Thermal injection in Qarn Alam, Upgrading for Colorado Oil Shales, waterflooding in Asab/Bab/Bu Hasa and many more. The key to many decision lies in the understanding of the underlying displacement process, its vulnerability and opportunities for a set-up that allows further optimisation.

Willem played a key role in defining the Brent Field depressurisation development that has very successfully maximised the recovery of gas and oil from the Brent Field.

Through his teaching to students and his mentorship of other staff at Shell, he knows how to engage and stimulate staff. In his current role as consultant, he is involved with various companies like ADNOC, Maersk, Petrom and JAPEx to analyze projects and future directions. He is the editor of the 2011 Resource-to-Reserves publication of the IEA (International Energy Agency, Paris). He is also the Chairman of the EAGE European IOR symposium and sits on the program committees of the SPE IOR meeting in Tulsa and the SPE EOR symposium in Oman.

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