Thermal EOR Methods – Advanced

Course format: lectures, hands on exercises

Trainer: Jos Maas PhD, Consultant

Jos has 30+ years of international reservoir engineering experience in the oil and gas industry and internationally recognized specialist in EOR, tight gas development and CO2 sequestration. Moved from a hands-on operational, reservoir engineer into senior research positions to become Shell's leading expert SCAL and EOR techniques. Since 2001, he focused on Sustainable Development, CO2 sequestration and geothermal energy. Jos has close links with academic research facilities in the Netherlands and abroad. He is invited guest lecturer at IFP (Paris) and Director of the Soc. of Core Analysts.
Jos is the 2011 Recipient of the Darcy Award for outstanding contributions to the advancement of core analysis technology. The Darcy award is the Society of Core Analysts' highest honour and the only award for technical achievement.

Course content

This course is intended for petroleum engineers with several years of experience. It spans over five days and covers:

Day 1 General introduction into thermal methods; How do thermal methods impact fractional flow and therefore affect remaining oil saturation; Impact of thermal methods on residual oil saturation; Estimate scope for enhanced recovery.

Day 2 Latent heat vs. sensible heat; Basic principles of hot water drives and steam drives, cyclic steam injection (huff-and-puff); Viscous fingering in steam drives vs. water drives; Sweep efficiency of hot water and steam drives.

Day 3 Steam drive in fractured reservoirs; Gravity drainage and impact of capillary forces on ultimate recovery; Steam distillation and thermal solution gas drive; Impact of brine salinity on thermal solution gas drive; Issues in numerical modelling.

Day 4 SCAL measurement issues around thermal EOR; residual oil measured in the laboratory vs. field; Design of SCAL measurement programs; Measurement requirements for thermal PVT on crude in the presence of brine.

Day 5 In-situ combustion, wet vs. dry, reverse combustion; Fuel requirements; Estimating sweep efficiency; SAGD; monitoring techniques tracking thermal fronts; Screening criteria for thermal EOR.

Learning objectives

This course provides deep insight into thermal recovery methods working from the basic physical principles into a discussion of the various engineering implementations in the field, process testing by laboratory experiments on drive mechanisms, SCAL and PVT for thermal processes, surveillance in the field. Analytical formulations will be presented for a first-pass design of thermal EOR projects. Numerical modelling issues specific to thermal EOR will be discussed in detail. Learning will be supported by numerous exercises.

Duration & location

This 5 days course can be offered either at the client's premises or at PanTerra.

Documentation

Each participant will receive a print-out of the course and exercises.