17TH – 21ST AUGUST 2015

ADVANCE PVT & EOS FLUID CHARACTERISATION

This 5-day master course will discuss the role of PVT tests/data in various aspects of Petroleum Engineering, particularly reserve estimation, reservoir modelling, flow assurance, and EOR. Participants will be introduced to various laboratory facilities, PVT tests and reports for various hydrocarbon systems are discussed in details. This includes quality control, designing tests, identifying the relevant data and maximising their utilisation. The course will also include a discussion on flow assurance and EOR, as well as relevant laboratory tests. Participants will have access to 30 days trial of a software for practicing some of the course materials in their own spare time.

Topic Outline

DAY 1

- An introduction to Petroleum Engineering, source rock, fluid migration, hydrocarbon reservoir formation
- Petroleum reservoir fluids, including paraffins, naphthenes, aromatics, non-hydrocarbons.
- Phase behaviour of single and multi-component systems, bubble/dew point line, critical point, phase change, phase envelop in multicomponent systems, cricondenbar and cricondentherm, retrograde condensation, changes in phase envelop as a function of composition.
- Classification of reservoir fluids, dry gas, wet gas, gas condensate, volatile oil, black oil
- Fluid sampling, downhole sampling, surface sampling, well preparation

DAY 2 & 3

- Introduction to PVT tests/reports, general structure of PVT report (examples of PVT reports)
- Effect of sample contamination, how to find out if the sample is contaminated, de-contamination options (examples)
- Quality checks, opening pressure, QC tests
- PVT test facilities, basic requirements, PVT cells for oil/gas condensate, other relevant test facilities
- PVT tests for dry gas, wet gas, black oil, gas condensate and volatile oil, including; Constant Composition Expansion (CCE), Differential Liberation (DL), Constant Volume Depletion (CVD), Separator Tests
- Identifying relevant data in PVT reports, conducting various calculations, including; oil Formation Volume Factor (Bo), Gas Formation Volume Factor (Bg), Gas Oil Ratio (GOR), Condensate Gas Ratio (CGR), API gravity, Z-factor, Total Formation Volume Factor, Isothermal Compressibility for Oil and Gas
- Case studies, PVT reports for various fluid systems, including black oil, volatile oil and gas condensate
- Introduction to Flow Assurance, definition, importance
- Laboratory equipment and tests for viscosity, wax, IFT, asphaltene, hydrates, scale, emulsion, foam

DAY 4 & 5

- Introduction to EOR, including gas injection, water alternating gas injection
- PVT tests for heavy oil and EOR
- Fluid characterisation
- Gas injection, ternary diagram, Minimum Miscibility Pressure/Enrichment, rising bubble, slim tube, forward contact, backward contact. Swelling
- Ideal gas law, real gas, Z-factor
- Equation of State (EoS), initial development, strengths and weaknesses, data requirements for modelling, need for tuning and laboratory data
- Most popular EOS, i.e., Peng Robinson (PR) and Soave-Redlich-Kwong (SRK)
- EOS modelling, data requirements, shift parameter, mixing rules, binary interaction parameter
- EOS tuning using the data generated in PVT tests
- Generating PVT files required for reservoir simulation
- Case studies including EOS tuning for a black oil and a gas condensate

Register Now!

For full details on the programme principal facilitator and to register, do not hesitate to contact us.

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