

Advances in Reservoir Fluid Properties Studies (Fundamental- Measurement- Simulation and Application) A course for 4 days

Purpose:

To develop knowledge and skills of attendees on understanding of advances in reservoir fluid phase behavior, laboratory PVT measurements, simulation of PVT and thermodynamics properties with emphases on the application in reservoir and production engineering and Improved Oil Recovery (IOR) studies, Asphaltene, wax and hydrates. A number of field applications cases will be presented and discussed using an industrial standard compositional reservoir simulator.

Course Objectives:

- To provide a sound introduction to Reservoir Fluid Phase Behavior from practical view point.
- To understand the routine PVT lab reservoir fluid analysis
- To understand PVT reports and Quality control Techniques and application.
- To understand the Production problems due to the wax, asphaltene, hydrates
- To set up a systematic approach for diagnosis, prevention and remedy of Asphaltene problems in the field.
- To apply the simulated data for Gas Injection and IOR project
- To Perform PVT simulation studies with Equation of State (EOS) modeling for designing lab studies and reservoir Engineering applications.

Course Topics:

This course is scheduled in 5 days, in each day the following topics will be covered:

Day 1: Introduction to Reservoir Fluid studies:

Concepts: Classification of petroleum fluids, Phase behavior fundamentals

- Course Introduction
- Case studies and industrial applications
- The role of fluid properties in reservoir development
- Reservoir fluid composition and classification of reservoir fluids etc
- Concept of phase behavior and reservoir fluid types
- Properties of Petroleum Gases and Liquids

Day 2: PVT Sampling and Measurements

Concepts: Reservoir Fluid Sampling and Laboratory Analysis

- Fluid Sampling Techniques and Strategy
- New technologies and instruments for oil and gas sampling
- New methods and instruments of GC for reservoir fluid analysis (i.e. monophasic reservoir fluid analysis for oil and gas condensate samples)
- Compositional Analysis of Reservoir Fluids
- Sample contamination and its remedy
- purification of oil samples from emulsified water

- PVT laboratory Measurements and advances
- Heavy oil characterization
- Understanding of PVT reports

Day 3: Asphaltenes, resins and other Heavy fractions in Petroleum

Concepts: New approaches of asphaltene deposition @ reservoir condition including inhibitor application

- Definition of Asphaltene and resins
- Understanding and dealing with Asphaltene and Wax Problems
- Precipitation/deposition mechanisms in crude oils,
- Oil wells and reservoirs problems due to Asphaltene flocculations .
- Review of laboratory methods for asphaltene and resin analysis.
- Definition and Asphaltene Deposition Envelope for a Reservoir Fluid.
- Methods to measure and/or estimate ADE data for reservoir fluids
- Screening of Asphaltene Inhibitors.
- Hydrate formation and inhibition in surface facilities and pipelines
- Wax deposition and its remedy with the latest researches around it

Day 4: PVT EOS simulation and PVT Special Studies

Concept: Cubic equations of state, VLE, and quantitative phase behavior

Concepts: Advanced measurement techniques for Gas Injection IOR/EOR Projects

- Over view of Reservoir Simulation
- Vapor- Liquid Equilibria.
- Thermodynamics of Phase Behavior
- General description of EOS and how it is used
- Fundamental of VLE calculations
- Phase envelope generation by EOS
- Heavy-End Characterization
- Case studies and industrial applications of EOS and phase envelope
- Miscible Process Study
- Aspects of phase behavior in Reservoir Simulation
- Simulation of PVT data and properties
- C7+ Characterization (Splitting/Grouping)
- Simulation of Differential Liberation
- PVT Matching
- Phase/Volumetric Behavior Matching
- Component Grouping
- Swelling Test Simulation
- Experimental reservoir fluid characterization from EOR point of view
- Gas injection(miscible, immiscible , CO2 injection)

**Training Methods:**

- Lectures and demonstrations.
- Hands on practical applications with PC.

Who should attend?

PVT Engineers and researchers, Production, Reservoir, Petroleum Engineers, Researchers in Oil Industry, professionals working for oil industry.

Prerequisites:

BSC in science or engineering, English language, Basic computer skills,

INSTRUCTOR RESUME**Reza P. Oskui, PhD**

Dr Oskui is Technical Director of Fluid Analysis Group in Texas Oiltech Laboratories in Houston, Texas. Since graduation from University of Manchester Institute of Science and Technology (UMIST-UK) in 1985 in Chemical Engineering, he has been working with International Oil and Service Companies in Phase Behaviour and PVT studies for reservoir fluids, IOR/EOR and gas injection projects in the UK, USA and in Petroleum Research & Studies Centre (PRSC) at Kuwait.

His main interests in the oil industry are: Reservoir Characterization, routine and special core analysis, phase behaviour and PVT measurement and simulation studies for reservoir fluids, EOS modelling, CO₂ and IOR gas injection processes, coreflooding and Asphaltene studies and Heavy oil. He has managed a number of gas injection IOR research projects during his working time in the oil industry.