



«BASIC WATERFLOODING: PHYSICS, TECHNOLOGIES, FIELD CASES», 5 days

COURSE OBJECTIVE:

improvement of professional competencies of petroleum engineers in sphere of waterflooding as secondary recovery method accompanied with significant change in physicochemical and hydrodynamic reservoir parameters which determine injection capability and productivity of wells.

ACQUIRED ABILITIES:

- determine reservoir physical parameters during recovery growth;
- analyze main processes during waterflooding and consider it in simulation and design of field development;
- mathematical modelling of waterflood;
- predict waterflooding, water cut and recovery;
- plan laboratory tests, interpret received data and determine rock permeability.

COURSE CONTENT:

Module Name	Content
Reservoir physics	Water relative permeability: role of reservoir wettability. Exercises. Types of wettability. Exercises. Heterogeneity of permeability and wettability.
Mathematical modelling of waterflood	Black oil versus compositional models – case studies. Geology and hydrodynamic simulation (CMG, Eclipse) - practice. Graphical-analytical method to predict waterflooding. Effects of oil viscosity and relative permeability. Exercises.
Laboratory waterflood tests	Calculation of relative permeability and capillary pressure from lab experiments. Exercises. Steady-state and unsteady-state methods – case studies.
Techniques and technologies of improved waterflooding	USSR methods: cyclic flood, changing well placing, advanced fracturing, etc. Brazil and China experience. Carbonate and sandstone oilfields – Oman, UAE.
Analysis of waterflood history	Waterflooding of heterogenetic reservoirs in history. Waterflooding decrease practice. Case studies: Brazil, USSR, North Sea, Gulf of Mexico