



«FUNDAMENTALS OF HCS MODELING», 3 days

COURSE OBJECTIVE:

Development of professional competencies of HC exploration, field development and production engineers in source rock characteristics, event scale, paleoreconstruction of sedimentary basin, and features of tectonic structure that is necessary for adequate basin modeling and oil & gas exploration planning.

ACQUIRED ABILITIES:

- Analyze a basin modeling results;
- Perform a paleoreconstruction of sedimentary basin;
- Determine a generation time, moment of rupture, and oil & gas deposits integrity;
- Gather required information for basin modeling;
- Generalize testing results and draw up performance reports.

COURSE CONTENT:

Module Name	Content
Introduction	Course objectives. Analysis tool – hydrocarbon systems (HCS) analysis. Geological risks while geological exploration. Non-productive wells reasons.
Methodology of basin modeling	Two concepts (hydrocarbon system and play). Concepts comparison. Moment of rupture, HCS age, deposit integrity time. HCS efficiency assessment.
Source rocks	Sedimentation environment of source rock. Areal convergence of reserves. Group and elemental composition of material. Kerogen, typology. Kerogen characteristics. Kerogen pyrolysis. Chemical composition. Motional spectrum. Kerogen maturity indicators: vitrinite reflectance, pirolytic method.
Reservoir and seal rocks	Reservoir rock parameters. Reservoir properties. Change in the process of basin evolution. AHFP reasons. Permeability dependence on porosity. Pressure profile. Fluid seal (cap) and its quality factors.
HCS processes	Sedimentary cover heating. HC generation process. HC migration. HC transformation in deposits. Oil & gas collapse reasons.
HCS modeling	Basin modeling: term and objectives. Tasks of basin modeling. Types and characteristics of sedimentary basins. Backstripping method. Causes of abnormally high formation pressure. Methods of modeling. Algorithm of modeling. Description of 2D and 3D modeling scheme. Model structural framework. Grid, its parameters, refinement (LGR technology). Geological events school. Profile selection for modeling. Lithological and geochemical characteristics of log. Tectonics and erosion. Principle of thermal reconstruction. Identification of boundary conditions. Model calibration. Results analysis. Darcy rule. Risks mapping.