



### «DRILLING FLUID ENGINEERING», 5 days

#### COURSE OBJECTIVE:

improvement of professional competencies in sphere of well washing, drilling fluid services, its content, specifications and drilling impact.

#### ACQUIRED ABILITIES:

- Apply acquired skills and knowledge in engineering;
- Optimize the quality of drilling fluid by its chemical treatment and prescribing of physical-chemical, technological properties;
- More deep understanding of fluid flow regularities and impact of hydrodynamic parameters on drilling process;
- Calculate required components amount for mixing of drilling fluid certain volume;
- Choose type and composition of drilling fluids with respect to the nature and impact of geological and technological factors;
- Apply technological criteria of washing fluids quality assessment while oil and gas wells construction.

#### COURSE CONTENT:

Module Name	Content
Drilling fluids	Functions of well washing process. Drilling fluids requirements. The concept of drilling fluid selection.
Drilling fluids as polydisperse systems	Basic terms. Surface phenomena. Colloid systems. Emultions. SAA. Clay mineral as disperse phase of drilling fluids. Clay properties management.
Features of drilling fluids	Mechanical, rheological, structural, filtration, electro-chemical properties of drilling fluids and control methods. Safety rules requirements for well washing and fluid properties. Lab equipment for drilling fluid properties identification and methodology.
Well washing	Features of vertical, directional and horizontal wells washing, quality factors.
Drilling fluids typology	Types of drilling fluids and its application. Clay and polymer clay fluids. Inhibitive fluids. Hydrocarbon-base fluids. Fluids for formation drilling. Aerated fluids. Foreign and Russian drilling fluids.

Technology of drilling fluids	Borehole sustainability. Wellbore instability caused by drilling fluid and clay shale layers interaction. Absorption of washing fluids, reasons. Circulation-loss control materials. Restore circulation. Sidewall sticking, factors, salvage operation fluids.
Engineering evaluation while well washing	Well washing design. Drilling fluid density determination. Calculation of drilling fluid volume. Calculations while mixing and weighting of drilling fluids. Material balance. Calculation while emulsion, polymer and polymer bentonite fluids mixing.
Mixing and cleaning of washing fluids	Circulation system. Drilling fluid mixing. Supplementary dispergation of clay fluids. Polymer and emulsion washing fluids mixing. Drilling fluids cleaning. Natural cleaning methods. Mechanical constrained cleaning methods with screen shakers. Advanced hydraulic methods. Hydraulic method through the use of hydro-extractor. Physical-chemical cleaning methods. Combined methods. Degassing methods.
Environmental control while well washing	Environmental control. Recycling of waste fluid and sludge. Methods of detoxification.