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Drilling Fluids; Characteristics of Colloidal Systems; Clay Mineralogy; Origin and Occurrence of Clay Minerals; Ion Exchange; Clay Swelling Mechanisms; The Electrostatic Double Layer; Particle Association; The Mechanism of Gelation; Polymers; References; Chapter 5. The Rheology of Drilling Fluids; Laminar Flow Regime; Turbulent Flow Regime; Influence of Temperature and Pressure on the Rheology of Drilling Fluids; Application of Flow Equations to Conditions in the Drilling Well Rheological Properties Required for Optimum Performance The Importance of Hole Stability; Notation; References; Chapter 6. The Filtration Properties of Drilling Fluids; Static Filtration; The Filter Cake; Dynamic Filtration; Filtration in the Borehole; Notation; References; Chapter 7. The Surface Chemistry of Drilling Fluids; Surface Tension; Wettability; Surface Free Energy; Adhesion; Surfactants; Emulsions; Oil-Wetting Agents; Foams; Defoamers; The Effect of Electrochemical Environment on Rock Failure; Notation; References; Chapter 8. Hole Stability; The Mechanics of Borehole Stability Hole Instability Caused by Interaction between the Drilling Fluid and Shale Formations Notation; References; Chapter 9. Drilling Problems Related to Drilling Fluids; Drill String Torque and Drag; Differential Sticking of the Drill String; Slow Drilling Rate; Loss of Circulation; High Temperatures; Corrosion of Drill Pipe; Notation; References; Chapter 10. Completion, Reservoir Drilling, Workover, and Packer Fluids; Expense versus Value; The Skin Effect; Prevention of Formation Damage; Selection of Completion and Workover Fluids; Tests for Potential Formation Damage by Completion Fluids Packer Fluids and Casing Packs

Sommario/riassunto

The petroleum industry in general has been dominated by engineers and production specialists. The upstream segment of the industry is dominated by drilling/completion engineers. Usually, neither of those disciplines have a great deal of training in the chemistry aspects of drilling and completing a well prior to its going on production. The chemistry of drilling fluids and completion fluids have a profound effect on the success of a well. For example, historically the drilling fluid costs to drill a well have averaged around 7% of the overall cost of the well, before completion. The success
