Drilling fluids technology means easier drilling

MULTILATERAL APPLICATION

Technology suppliers have produced special systems to handle a range of typical multilateral applications. One of the challenges yet to be sufficiently addressed is a system that can be oriented downhole without pipe rotation.

The driver for such a system can be an environment where rig capacity, namely hoisting capacity, is a limiting factor for most multilateral applications on the market today. Until such a system is commonplace, a focus on gaining hoisting capacity to fit the application will have to be the general rule.

A specialized invasion control drilling fluid has been devised to drill reservoirs prone to lost circulation. This fluid combines certain surfactants and polymers to create a system of micro-bubbles or aphrons that are encapsulated in a uniquely viscosified system.

The derrick and drawworks capacities will be discussed first. Then, a description of the physical characteristics of methods and any drilling fluid additives used to gain hoisting capacity will be followed by a chronology of events leading to the implementation and orientation of a Level 3 multilateral.

A Multilateral Application in a Limited Hoisting Capacity Environment (SPE/IADC 79838) by **A R Bristar**, **J A Bonner**, **ChevronTexaco; M Broderick**, **K and M Technology Group**.

ENGINEERED HT FLUID

Along with exorbitant costs and safety considerations, drilling in a high temperature, high-pressure environment poses the difficult challenge of protecting a reservoir that is often depleted.

The paper details the design of a unique water-base reservoir drill-in fluid and its successful application on five HTHP wells in the Kalinovac and Molve gas fields of Croatia. Four of the wells were high-angle re-entry slim holes.

Using laboratory, field, reservoir investigation and computer data, the authors will demonstrate the effectiveness of the new fluid in delivering zero skin damage and subsequently higher production rates than other wells in the field. Further, the system significantly reduced operating costs by eliminating costly stimulations, while simplifying the generation of clear imaging logs.

Uniquely Engineered Water-Base High Temperature Drill-In Fluid Increases Production, Cuts Costs in Croatia Campaign (SPE/IADC 79839) by **T Soric**, **INA**; **P Marinescu**, **R Huelke**, **M-I Drilling Fluids.**

NOVEL DRILLING FLUID

Drilling depleted reservoirs is fraught with a host of technical and economic problems that often make it unprofitable to further develop some mature fields.

Most of the problems center around uncontrollable losses and differential sticking. Frequently, less expensive drilling fluids will be used in a particular interval, even though it may have the propensity to damage the formations.

A specialized invasion control drilling fluid has been devised to drill reservoirs prone to lost circulation. This fluid combines certain surfactants and polymers to create a system of micro-bubbles or aphrons that are encapsulated in a uniquely viscosified system.

Aphron-based systems are engineered drilling fluids that aid in well construction by controlling losses in depleted high-permeability sands while stabilizing pressured shales or other formations.

One of the more attractive features of an aphron-based system is that it does not require any of the extra equipment used in air or foam drilling. There are no compressors, high-pressure hoses or connections to add costs and safety concerns. The system uses conventional fluid-mixing equipment to form tough, flexible micro-bubbles.

Aphron-Based Drilling: Novel Technology for Drilling Depleted Formations in the North Sea (SPE/IADC 79840) by **A Chester**, **NAM**; **C Ivan**, **S Maiuranz**, **M-I Drillng Fluids**.

THERMAL INSULATING FLUIDS

Production from fields developed in deeper and colder waters requires that the hydrocarbons brought to the surface be at the highest possible temperature to avoid blocking of a production line by asphaltines, paraffins and hydrates.

The recent development of a lightweight hybrid riser for a deepwater completion in the North Sea required a thermal insulating fluid that was both cost effective and environmentally acceptable.

This paper describes a unique joint project to develop a lightweight riser and insulating fluid.

The authors will detail several formulations, both mineral oil and water-based fluids including simple techniques to measure thermal conductivity, diffusivity and heat capacity.

The Development and Application of Environmentally Acceptable Thermal Insulating Fluids (SPE/IADC 79841) by **A Dzialowski**, **H Ullmann**, **M-I Drilling Fluids**.

GEL BREAKING MODEL

The paper addresses the problem of predicting pressure peaks when starting pumps after a static period while drilling a well. Laboratory experiments demonstrate to what extent standard FANN viscosity measurements are useful, and show how much is gained by using more advanced rheometers.

Gel breaking and tixotropy were first analyzed in detail through rheometer measurements. The fluids showed a clear time dependent behavior.

Afterwards each fluid was placed in a flow loop where circulation was started after a static period. Clear time dependent signals were observed and analyzed. First a sharp pressure peak and then a slow decrease in pressure was typical.

Transient Gel Breaking Model for Critical Wells Applications with Field Data Verification (SPE/IADC 79843 - Alternate) by **K S Bjorkevoll**, **R Rommetveit**, **B Aas**, **H Gjeraldstveit**, **RF-Rogaland Research**; **A Merlo**, **ENI-Agip**. ■