**CHALLENGE**

Potential causes of formation damage related to drill-in and completion fluids include:

» Fine drilled solids and foreign particle invasion and plugging
» Formation clay swelling, dispersion and migration
» Drilling fluids that are chemically incompatible with natural reservoir fluids
» Fluid invasion
» Emulsion and water blocking.

If not addressed, these challenges can lead to lost circulation, wellbore stability issues, and ultimately decreased production.

**OVERVIEW**

Baroid’s DRIL-N® clay-free reservoir drilling fluids are designed to minimize formation damage and help achieve maximum production potential. These fluids can be formulated with freshwater or brine, and contain thermally stable polymers for suspension and filtration control as well as acid soluble, sized calcium carbonate bridging particles. With the engineered bridging materials, Baroid’s DRIL-N fluids can be designed to build an impermeable filter cake to help stop solid and fluid invasion. The acid-soluble filter cake can then be easily removed to avoid restricting the flow of hydrocarbons into the wellbore during production.

BARADRIL-N® non-damaging reservoir drill-in fluid system is formulated with freshwater or brine with a fluid density of 8.6 to 14.5 lb/gal.

BRINEDRIL-N® non-damaging reservoir drill-in fluid is a high-density, brine-based system with a density range of 11.0 to 16.5 lb/gal.

The BARADRIL-N system has consistently demonstrated good fluid-loss control, stable rheology, and quick cleanup. The system can be weighted or unweighted, depending on application, and encompasses a density range of 8.6 lb/gal to 14.5 lb/gal (1,031 to 1,738 kg/m³). The BARADRIL-N system can be formulated with seawater, freshwater or potassium and sodium brines.

The BRINEDRIL-N system is a heavy brine fluid system prepared in calcium chloride or bromide brine. The BRINEDRIL-N system has a density range of 11.0 to 18.0 lb/gal (1,318 to 2,157 kg/m³). The system exhibits high viscosities at low-shear rates and shear-thinning capabilities.

**FEATURES**

» Acid soluble filter cake
» Exhibits excellent fluid loss control
» Stable rheology
» Uniquely high, low shear rate viscosities and shear-thinning capabilities
» Creates stable, thin, low-permeability filter cake

**BENEFITS**

» Non-damaging to the reservoir
» Helps increase wellbore stability
» Effective suspension and fluid loss control
» High penetration rates and excellent lubricating characteristics
» Easy to prepare and maintain in the field
RETURN PERMEABILITY

The filter cake left behind by BARADRIL-N and BRINEDRIL-N drill-in fluids does not hinder or slow reservoir clean up procedures, and the filter cake is easily removed with N-FLOW™ filter cake breakers. Return permeability studies have consistently shown greater than 85% return permeability.

This chart shows a return permeability study using a BARADRIL-N system formulated with 9.1 lb/gal brine.

This chart shows a return permeability study using a BRINEDRIL-N system in a sandstone formation. The BRINEDRIL-N system caused no residual damage and can achieve up to a 100% return permeability.
PARTICLE SIZE DISTRIBUTION

The bridging material in the BARADRIL-N and BRINEDRIL-N systems can be customized using WellSET® modeling software to define the required particle size distribution for the reservoir rock average pore throat size. This custom-sizing capability minimizes particle invasion and fluid loss to the producing formation.

The chart below displays the particle size distribution of the BARACARB® bridging material that can be used in the BARADRIL-N system.

When it comes to drill-in fluids, Baroid realizes the importance of protecting the reservoir. BARADRIL-N and BRINEDRIL-N reservoir drill-in fluids are non-damaging, can improve wellbore stability, provide effective fluid-loss control and enable high penetration rates, helping you to achieve maximum production. In addition, Baroid’s DRIL-N fluids are customized based on the reservoir’s characteristics for optimal results.

For optimum performance, BARADRIL-N and BRINEDRIL-N drill-in fluid should be combined with Baroid’s N-FLOW™ filter cake breaker system.