Challenge
In land operations, the challenge is reaching TD as fast as possible with no NPT issues. In many locations, these operations have become routine but there is usually room for improved efficiencies and cost reduction. Invert emulsion fluids traditionally provided faster rates of penetration (ROP) but carry greater environmental liability than water-based fluids, requiring higher ancillary treatment costs. Operators continually seek a water-based fluid that can emulate invert emulsion performance.

Overview
The BOREMAX® non-dispersed, low-solids system is a unique fresh-water drilling fluid that performs well under extreme conditions including high differential pressures, acid gas, wet cement, and high temperatures. The BOREMAX system’s unique polymer chemistry helps it compete with invert emulsion systems in terms of penetration rates and wellbore stability, while helping operators minimize environmental impact and save on dilution and disposal costs. BOREMAX system has been used on hundreds of land wells and has helped set US land records.

Benefits
BOREMAX system contains unique additives that use polymers to provide improved inhibition over conventional systems, effectively eliminating clay and significantly reducing solids content. The result is faster ROPs. Benefits include:

- Maximum wellbore stability
- Improved hole cleaning
- Reduced torque and drag
- Lower ancillary rig costs
- Minimize environmental impact
- Lower dilution rates
- Near-gauge wellbore
- Economical fluid loss control
- Aggressive penetration rates
- Superior hole cleaning
- Effective logging operations
- Helps minimize or prevent thermal flocculation
- Economical cementing operations

BOREMAX® High-Performance Freshwater fluid
A water-based fluid with oil-based fluid performance

Comparison between US land wells drilled with different fluids. BOREMAX freshwater system provides the cost and environmental benefits of a water-based system but can achieve high ROPs.
Features

- Highly inhibitive, non-dispersed system
- Uses unique polymer and inhibitive chemistry, contributing to:
  - Improved lubricity
  - Thixotropic rheological properties
  - Clay free, low colloidal content
  - Provides lubricious, thin filter cake
  - Flat rheology over wide temperature range
- Freshwater based
- Resistant to contaminants and tolerant of low gravity solids
- Improved fluid loss control
- Helps control bit balling
- Exceptionally low MBT
- Ability to drill overbalanced

The BOREMAX system is maintained without the need for dispersants and caustic materials. Overall, the system is run with very few chemical additives, thus reducing the number of lifts per job. The proprietary blend of polymers makes the system easier to engineer and helps assure the same quality from job to job.

Applications

BOREMAX freshwater-based fluid was designed for land operations where operators want easy, low cost disposal of their drilling fluid and decreased impact on the environment. It has thermal stability up to 300°F (148°C) and a density range up 17.5 lb/gal. Difficult formations can now be drilled with a water-based fluid at high ROPs, where previously only synthetic or oil based fluids could do the job without excessive NPT. Difficult formations include porous sandstones, fractured limestones, impermeable shales and clays. BOREMAX system has also proven effective in casing-while-drilling operations with restricted annular clearances.

HP/HT filter cake quality comparison

12.0 lb/gal BOREMAX HP/HT Filtrate – 15.8 ml @ 250°F
Filtercake – 2/32 inch

12.0 lb/gal water-based HP/HT Filtrate – 16.6 ml @ 250°F
Filtercake – 8/32 inch

Total Dilution
Water, Whole Mud, Barite & Chemicals

<table>
<thead>
<tr>
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<th>CLS conventional water-based fluid</th>
<th>BOREMAX® fluid</th>
<th>Difference</th>
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<tr>
<td>Bbls</td>
<td>6,023</td>
<td>3,483</td>
<td>2,540</td>
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BOREMAX system significantly reduces dilution resulting in easy fluid maintenance and increased fluid recycling. Subsequently, waste generated and haul-off volume is reduced, also reducing costs associated with transportation and disposal.

Total Haul-off Volume

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<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bbls</td>
<td>2,577</td>
<td>1,451</td>
<td>1,126</td>
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