QMax Performance

QMAXDRILL (HPWBM)

Experience

QMAXDRILL, our HPWBM, has been applied successfully in hundreds of wells mainly in South America (Colombia, Ecuador and Peru) and India. Some other wells have been drilled in Canada and USA. More than 350 wells have been drilled in Colombia where very water sensitive formations are encountered while drilling. Technically, these wells should be drilled with oil-based mud, but due to environmental restrictions, the use of such muds is forbidden. QMAXDRILL has outperformed any other fluid used in the region and is environmentally friendly. In India, 301 wells have been drilled with the QMAXDRILL system, with an additional component, CBMax, which is a wellbore stabilizer for drilling CBM (Coal Bed Methane) wells.

Challenges

Achieving the same performance as an Oil-based drilling fluid has been the objective of the so-called HPWBM (High Performance Water Based Muds). QMAXDRILL achieved that in many of the fields where it has been applied such as in the Orito field in Colombia where wellbore instability, high torque and drag, tight hole was experienced before, even with OBM. In that specific field, an alternative to OBM had to be found due to environmental issues with the OBM. A QMAXDRILL formulation was designed and wells were drilled with good results from the operational standpoint as well as from the economics and environmental standpoint. Some other challenges that the QMAXDRILL system has overcome:

- Minimizing clay swelling
- Preventing bit / BHA balling
- Preventing formation of Mud Rings
- Minimizing Pore Pressure Transmission

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Results

QMAXDRILL mud system has shown very good performance drilling challenging wells. The main component of the system is an amine that when in contact with water produces the ammonium ion, which due its hydrated size, allows a cationic exchange between the fluid and clay avoiding hydration and subsequent swelling.

Besides the clay inhibition benefits, QMAXDRILL system offers low filtration rates, wide range of rheological properties and enhanced lubrication.

The QMAXDRILL mud system is a very cost effective alternative to Synthetic Based Mud. Disposal costs are reduced by half when comparing with a non-aqueous system.

The cost per barrel of the QMAXDRILL system is very competitive compared to others High Performance Water Based Mud Systems (HPWBM) and very low compared with Oil Based fluid.

![Interchangeable cation](image)

<table>
<thead>
<tr>
<th>CATION</th>
<th>IONIC diameter Å</th>
<th>HYDRATED diameter Å</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na⁺</td>
<td>1.90</td>
<td>11.2</td>
</tr>
<tr>
<td>K⁺</td>
<td>2.66</td>
<td>7.6</td>
</tr>
<tr>
<td>Ca++</td>
<td>1.98</td>
<td>19.2</td>
</tr>
<tr>
<td>Amines</td>
<td>2.5-7.5</td>
<td>2.5-7.5</td>
</tr>
</tbody>
</table>

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