BaraBlend®-657 and BARAFLAKE® C LCM Combo Reduces Static Loss Rate to Zero

PRUDHOE BAY, ALASKA

OVERVIEW
An operator in Prudhoe Bay, Alaska, encountered severe downhole losses while drilling an 8-1/2-inch intermediate interval. Although no faults or fractures were mapped in the seismic profile, it was evident that the wellbore was following the plane of a loss zone. The high loss rate was also indicative that the fractures were significantly larger than what is normally encountered in this field.

Losses recurred after every attempt to drill ahead, and static losses of 600 bph were recorded. The well was on a strong vacuum. This condition had to be controlled before a remedial plan could be put in place.

Pumping a conventional lost circulation material (LCM) pill (Pill 1) in a successive fashion into the loss zone through a circulating sub delivered only temporary loss abatement.

LCM COMBO TARGETS LARGE FRACTURES, BRINGS LOSS RATE TO ZERO

Baroid personnel proposed a combination of BaraBlend®-657 premium, coarse-sized acid-soluble multi-modal LCM supplemented with BARAFLAKE® (Coarse) LCM. Laboratory analysis was performed to test the proposed formulation and its pumpability in a 10.5-ppg low-solids non-dispersed (LSND) drilling fluid.

A BaraBlend-657/BARAFLAKE C pill (Pill 2) containing 120-ppb LCM was pumped, which reduced the static loss rate to 72 bph.

This treatment was followed by a second BaraBlend-657/BARAFLAKE C pill, which reduced static losses to zero and allowed essential operations to take place with no further disruptions.

BaraBlend-657 LCM is a single-sack combination of particulate sizes and types, designed specifically to help stop lost circulation by quickly sealing fractures up to 3,000 microns in width. When supplemented with BARAFLAKE C LCM, it has proven to seal holes up to 0.5 inch in size.

BARAFLAKE sized calcium carbonate chips, available in medium and coarse particle sizes, offer better resistance to particle size reduction while drilling compared to flake-like calcium carbonate.
LCM Pill 1 vs. Pill 2: Impact on Static Loss Rate

<table>
<thead>
<tr>
<th>LCM Pill Sequence</th>
<th>Static Loss Rate (bph)</th>
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<tbody>
<tr>
<td>40-ppb/80-ppb conventional pills pumped during attempts to resume drilling</td>
<td>Varied</td>
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<tr>
<td>110-bbl LCM Pill 1</td>
<td>600</td>
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<tr>
<td>50-bbl LCM Pill 1</td>
<td>550</td>
</tr>
<tr>
<td>50-bbl BaraBlend®-657/BARAFLAKE® C Pill 2</td>
<td>175</td>
</tr>
<tr>
<td>80-bbl BaraBlend-657/BARAFLAKE® C Pill 2</td>
<td>72</td>
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WELL SUCCESSFULLY CEMENTED AND SIDETRACKED AFTER SPOTTING TWO PILLS

When the BaraBlend-657/BARAFLAKE C pills stopped the static losses, the operator was able to trip and perform a cement squeeze job. The wellbore was successfully abandoned and a sidetrack was then drilled.

Drilling fluid costs were as high as USD 45,000 per hour while the well was on vacuum, and the rig rate was nearly USD 350,000 per day. It was critical to minimize any further nonproductive time in a timely manner.

Final resolution of the issue was only seen after pumping pills containing a combination of BaraBlend-657 and BARAFLAKE C LCM. These customized LCM pills stopped the losses, thus enabling the operator to continue well operations.