Perforating with Water Control Boosts Production 1,470%

Case study: OrganoSEAL, SqueezeCRETE technologies reduce water cut to traces in Pemex Samaria well

Challenge
Increase hydrocarbon production and control water cut in a highly fissured reservoir with an active aquifer and poor primary cementing.

Solution
Selectively place a combination of OrganoSEAL* organic crosslinked gels and SqueezeCRETE* remedial cementing solution to block water-producing fissures; complete a perforating job on the target zone.

Results
Increased oil production by 1,500 bbl/d; reduced water cut to traces from the original 76%.

Water cut in mature field
Pemex encountered water cut issues in an oil well in the Samaria field within the Complejo Antonio J. Bermudez formation. The mature field's challenges included poor primary cementing, channeling through natural fissures, and advancing water/oil contact (WOC).

Well 2185's water production increased to 80%. Pemex pumped an exclusion treatment using selective microcement to eliminate the water influx; unfortunately, the treatment failed. A PLT* log showed water flow from the 4,203- to 4,235-m interval. The well produced 477 bbl/d of fluid with 114 bbl/d of net oil—a water cut of 76%.

In view of these results, the company planned a second intervention to reduce water cut before a planned perforation job. This time, a more detailed analysis of the production mechanism was performed first to determine whether water was flowing through fissures to a water-bearing formation underneath the production zone.

Dual-purpose fluid combination
For treating the specific zone, Pemex selected a combination of Schlumberger fluids to

- achieve deep penetration to block water from penetrating fissures
- allow selective placement to stop water from flowing into a zone to be perforated above the sealed section.

WOC advancing through fissures.
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Two different types of OrganoSEAL organic crosslinked gels were used. OrganoSEAL F gel was used to achieve the deepest penetration into the fissures, and OrganoSEAL R gel, a more rigid gel, was applied closer to the wellbore to achieve better resistance to drawdown. In addition, SqueezeCRETE remedial cementing solution was selected to seal the perforations because of its low density, low viscosity, and good mechanical set-cement properties. CemNET® advanced fiber technology was added to block the perforations and avoid overdisplacement into the formation, given its high permeability (130 mD) and low pressure (139 kg/cm²).

Following treatment of the 4,203- to 4,235-m interval, the 4,125- to 4,155-m zone was perforated.

**High oil increase, low water cut**

The net oil increase was greater than 1,500 bbl/d, and water cut was reduced to almost zero. The well yielded a net oil production increase of 1,470% with only traces of water.

The typically required stimulation of newly added intervals was not necessary, which reduced the well intervention time and associated costs. Precise placement of the treatment fluids effectively blocked water from the fissures and allowed water-free production of the added perforations.

**Well schematic.**

<table>
<thead>
<tr>
<th>Production After Treatment</th>
<th></th>
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<tbody>
<tr>
<td>Gross</td>
<td>1,685 bbl/d</td>
</tr>
<tr>
<td>Net</td>
<td>1,682 bbl/d</td>
</tr>
<tr>
<td>Water cut</td>
<td>0.2%</td>
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</tbody>
</table>

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