

New Mexico: APHRON ICS™ System Drills Through Highly Fractured Zone Without Losses

“The APHRON ICS system drilled with no detectable mud losses although FMI logs indicated fractures of 1-3 inches wide in this loss-prone reservoir section.”

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Well information

Location:	Indian Basin Field, New Mexico
Spud/completion:	March 2000
Total footage drilled:	678 ft from 7222 to 7900 ft
Surface density:	7.5-7.8 lb/gal (with conventional mud balance)
Drilling days:	3

The situation

This area of New Mexico is typically prone to mud losses varying from seepage to total with the only option sometimes being blind drilling to total

depth. The operator required an alternative to conventional whole fluid loss control methods and the materials used in damage-prone reservoirs.

The solution

Due to previous success with this system in South America, the APHRON ICS system was proposed to reduce down-hole losses and control reservoir damage. The bridging mechanism of the aphrons combined with the elevated low-shear-rate viscosities inherent to the system, effectively controls invasion into depleted or

fractured reservoirs. These reservoirs are commonly prone to damage through any whole mud loss. Although the system's surface density is reduced, hydrostatic pressure compresses micro-bubbles to produce normal density down-hole. Reduced pressures in loss zones cause bubble aggregation and bridging.

The results

- No Losses. The aphron section was drilled with no detectable mud losses.
- Acceptable torque/drag. No excess drag or torque was noted.
- Minimal pump losses. Pump pressure losses were minimal, 100-200 psi, with no adverse effects on performance.
- Effective logging. All logs were run to total depth with no problems. FMI logs indicated fractures 1" to 3" wide.
- Good cement job. Casing was set at total depth and cemented with no problems.
- No corrosion. Laboratory testing on an active system sample indicated no appreciable corrosion rates.

APHRON ICS benefits:

- Environmental compliance



The details

The 8¾" hole was drilled from 1,300 to a total measured depth of 7,900 ft. The APHRON ICS system was introduced at approximately 7,220 ft. During a bit trip, the rig's surface system was jetted and cleaned to eliminate any settled solids. Once circulating, the system was then broken over to the APHRON ICS system before entering the potentially troublesome Cisco formation at 7,389 ft.

The LSRV was raised to >50,000 cP with polymer additions of GO-DEVIL II and ACTIVATOR I. The rig mixing system provided sufficient air & energy to assist in generating

the required surfactant-induced microbubbles. BLUE STREAK, a special surfactant, is added to develop and maintain an evenly dispersed, stable microbubble population.

Drilling continued to a total depth of 7,900 feet without problems or downhole losses. The well was successfully logged and cased: no fill, no bridges, no repeat runs.

The typical APHRON ICS system formulation for this interval was 4.0 lb/bbl of GO-DEVIL II, 5.0 lb/bbl ACTIVATOR I, 0.5 lb/bbl ACTIVATOR II, 0.75 lb/bbl BLUE STREAK, 1.0 ACTIGUARD, and 0.5 lb/bbl biocide.

The APHRON ICS system proved to be highly stable with the following properties:

Properties	7332 ft	7900 ft
Density, lb/gal	7.7	7.9
PV, cP	14	11
YP, lb/100 ft ²	38	43
LSRV, cP	96,000	71,600
Gels, lb/100 ft ²	14/28/30	14/26/28
Fluid loss, mL	10.2	10.0

Questions? We'll be glad to answer them.

If you'd like to know more about the APHRON ICS system and how it's performing for our other customers, please call the M-I office nearest you.

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